

STRUCTURE OF MICROCARD

A01/1 = Structure of microcard
A03/1 = Special features, general instructions, safety measures, testers, tools and tightening torques

C01/1 = Disassembling fuel-injection pump
= Checking individual components
= Assembling fuel-injection pump

N21/1 = Index
N23/1 = Table of contents
N28/1 = Editorial note

Continue: A02/1 Fig.: A01/2

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		SIS									
A		XXXXX	XXXXX	XXXXX	XX						
B		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
C		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
D		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
E		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XX				
F											
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STRUCTURE OF MICROCARD

The user prompting appears on every page, e.g.:

- Continue: B17/1

- Continue: B18/1 Fig.: B17/2

.../1 = Upper coordinate half

.../2 = Lower coordinate half

Continue: A03/1

REPAIRING DISTRIBUTOR-TYPE FUEL-INJECTION PUMP

These repair instructions apply to
VE pumps with no:

- * Boost-pressure-dependent full load
stop (LDA)
- * Hydraulic torque control (HBA)

Special features:

- * Temperature-dependent excess fuel
quantity (TAS)
- * Temperature-controlled idle
increase (TLA)

Continue: A04/1

REPAIR INSTRUCTIONS

General

These repair instructions are subdivided into:

- * Component repair for:
 - Central screw plug
 - Overflow restriction
 - Solenoid valve
 - Speed-control lever stiff
 - Leaks at delivery-valve holder
 - Renewing radial-lip-type oil seal
 - Timing-device seal rings
 - Renewing housing cover seal, control lever bearing
- * Complete pump repair

Continue: A04/2

REPAIR INSTRUCTIONS

Scrap worn and damaged parts.

Always renew sealing elements.

* Component cleaning

Wash out components in commercially available cleaning agent which is not readily flammable, e.g.:

Chlorothene NU.

Then blow out with compressed air.

OBSERVE FOLLOWING SAFETY PRECAUTIONS

Order Governing Work with Combustible Liquids (Vbf) as published by Federal Ministry of Labor (BmA).

Continue: A05/1

REPAIR INSTRUCTIONS

Safety regulations governing the
handling of chlorinated hydrocarbons
in companies ZH 1/ 222
for employees ZH 1/ 119
as published by the Hauptverband für
Gewerbliche Berufsgenossenschaften
(Zentralverband für Umweltschutz und
Arbeitsmedizin) Langwartweg 103, 5300
Bonn 5, Germany.
The appropriate local regulations are
to be heeded in other countries.

Continue: A06/1

SAFETY MEASURES

EXCLUSIVE use is to be made of the special tools listed in these repair instructions.

INJURIES CANNOT BE RULED OUT if these tools are not used !

Continue: A06/2

SAFETY MEASURES

The procedure outlined in the Section "Removing control lever, pump with mechanical and spring-actuated power on/off damper" must be carried out with extreme caution.

Sudden spring tension relief and thus the DANGER OF INJURY cannot be precluded!

Continue: A07/1

TOOLS AND TEST EQUIPMENT

Clamping flange Pilot 50 mm diameter	1 685 720 062
Clamping flange Pilot 68 mm diameter	1 685 720 219
Clamping frame Clamping VE	KDEP 2919
Prestroke measuring device Replacement for ..045, prestroke adjustment	1 688 130 180
Tool kit	KDEP 1170
Tool kit Pressing in drive shaft bearing	KDEP 1171

Continue: A07/2

TOOLS AND TEST EQUIPMENT

Drill bushing Drilling out 1-piece drive shaft bearing on side	KDEP 1882
Dial-indicator holder Adjustment of dimensions "K" and "KF"	KDEP 1088
Centering sleeve	KDEP 1088/0/3
Measurement insert Adjusting K1 dimension	KDEP 1088/0/2
Measurement support, thread M 3	1 683 233 012
Adjustment tool Adjusting governor shaft with slotted nut	KDEP 1082

Continue: A08/1

TOOLS AND TEST EQUIPMENT

Adjustment tool KDEP 1181
Adjusting governor shaft on
pump with hydraulic KSB attachment

Assembly device KDEP 1109

Pin-type socket wrench KDEP 1110
Assembly of KSB control device

Assembly tool KDEP 1097
Removing and installation of
supply pump

Protective capsule KDEP 1100
Support for cam roller ring

Continue: A08/2

TOOLS AND TEST EQUIPMENT

Assembly shell KDEP 1101
Support for supply pump

Socket wrench KDEP 1087
Loosening and tightening
of slotted shoulder screws
with hexagon socket head

Assembly wrench KDEP 1096
Installation of setting
shaft in housing cover

Assembly sleeve KDEP 2939
Protection of
radial-lip-type oil seal

Continue: A09/1

TOOLS AND TEST EQUIPMENT

Assembly sleeve	KDEP 2937
Installing O-ring on setting shaft/lever shaft	
Extractor hook	KDEP 2938
Removal of seal rings	
Socket wrench	KDEP 1086
Removal of control valve	
Screwdriver bit	KDEP 1090
Installing slotted screw	

Continue: A09/2

TOOLS AND TEST EQUIPMENT

Clamping device	KDEP 1102
Clamping sliding bolt	
Spacer	KDEP 1084
Adjusting MS dimension	
Dial-indicator holder	KDEP 1128
Measuring tilt clearance	
Dial-indicator holder	KDEP 1146
Measuring tilt clearance	
Spacer	KDEP 1130

Continue: A10/1

TOOLS AND TEST EQUIPMENT

Adjustment tool
Assignment of stop lever
to lever shaft KDEP 1152/3

Extractor
Removing radial-lip-type
oil seal KDEP 1113

Extractor
Removing drive pinion KDEP 1131

Pressing-out and
pressing-in tool
Bearing replacement KDEP 1132

Continue: A10/2

TOOLS AND TEST EQUIPMENT

Screwdriver bits for
torque wrench 1/2 inch
square head
Bolts with Torx socket
head M6 and M5

Commercially
available

Bolts with internal serrations M6

Molykote paste
Special oil
Guide pin in LDA housing

Ft 70 v 1

Shell Glavus G 32

Continue: A11/1

TIGHTENING TORQUES

Select torques in line with following add-on modules:

VE with no add-on module	A13/1
Cam roller ring, cold start acceleration device, coolant temperature-controlled	A17/1
2-piece control lever	A18/1
Bleeder screw at cam roller ring level	A19/1

Continue: A11/2

TIGHTENING TORQUES

Select torques in line with following add-on modules:

Coupling half and flange	A20/1
Frequency valve	A22/1
Hydraulic cold start acceleration device	A23/1
Pneumatic idle increase (PLA)	A25/1

Continue: A12/1

TIGHTENING TORQUES

Select torques in line with following add-on modules:

Temperature-dependent idle increase (TLA)	A26/1
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Mounting plate	A27/1
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Ancillary lever, spring-actuated power on/off damper	A28/1
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Stop bracket for switching valve	B01/1
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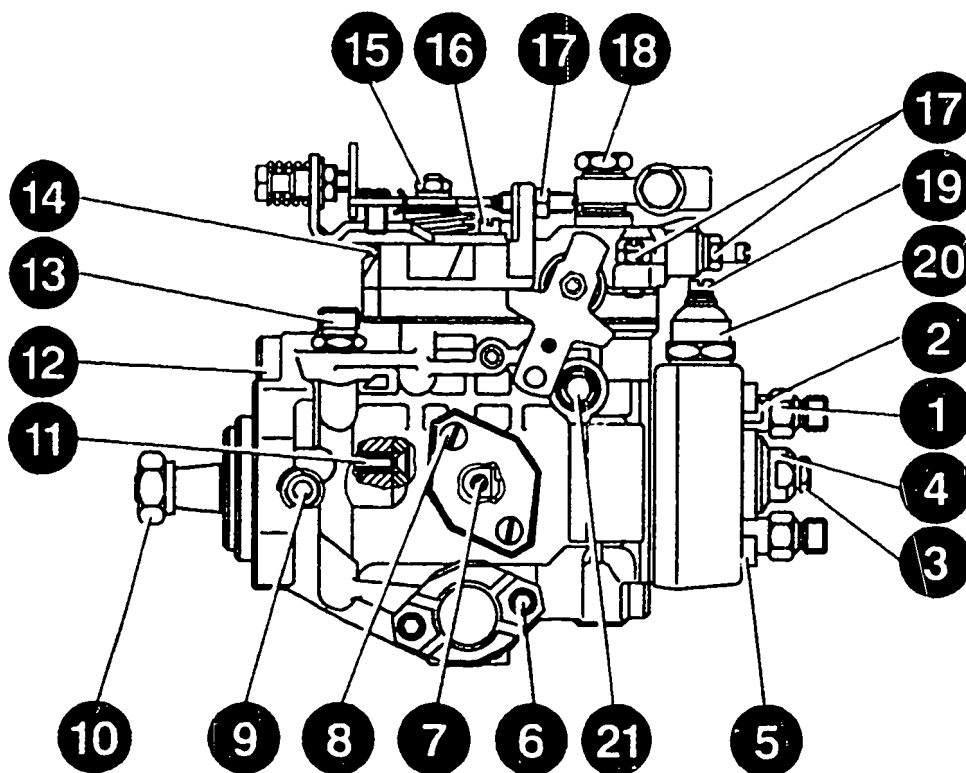
Switching valve	B02/1
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Continue: A13/1

TIGHTENING TORQUES FOR PUMP WITHOUT ADD-ON MODULE

1 = Delivery-valve holder	38..42 Nm
Used delivery-valve holders	
Delivery-valve holder	38..48 Nm
New delivery-valve holders, new distributor head	
2 = Bleeder screw	5.. 8 Nm
3 = Bleeder screw	20..26 Nm
4 = Screw plug	70..90 Nm
5 = Fillister-head/hexagon- socket-head cap screw	7..10 Nm
6 = Fillister-head screw	10..14 Nm
7 = Fillister-head screw- pointer	2.. 3 Nm
8 = Fillister-head screw	6.. 9 Nm
9 = Locking screw	27..35 Nm

Continue: A14/1 Fig.: A13/2



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**TIGHTENING TORQUES FOR PUMP WITHOUT
ADD-ON MODULE**

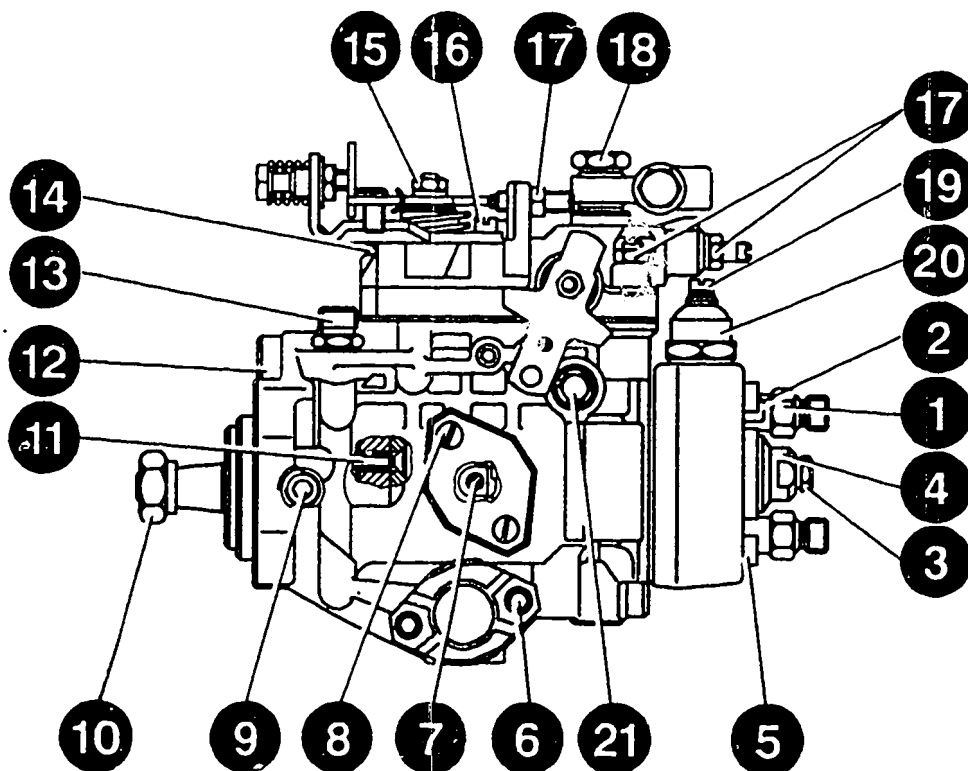
10 = Hexagon nut 60..70 Nm
Thread M12 / taper 17 mm
Part no. 2 915 011 011

Hexagon nut 90..95 Nm
Thread M14x1.5 / taper 20
Part no. 2 915 021 004
Part no. 1 463 300 316

Flat nut 70..75 Nm
Thread M14x1.5 / taper 20
Part no. 2 915 042 106

11 = Hexagon bolt, supply pump 2.. 4 Nm
12 = Slotted hexagon nut 22..30 Nm

Continue: A15/1 Fig.: A14/2

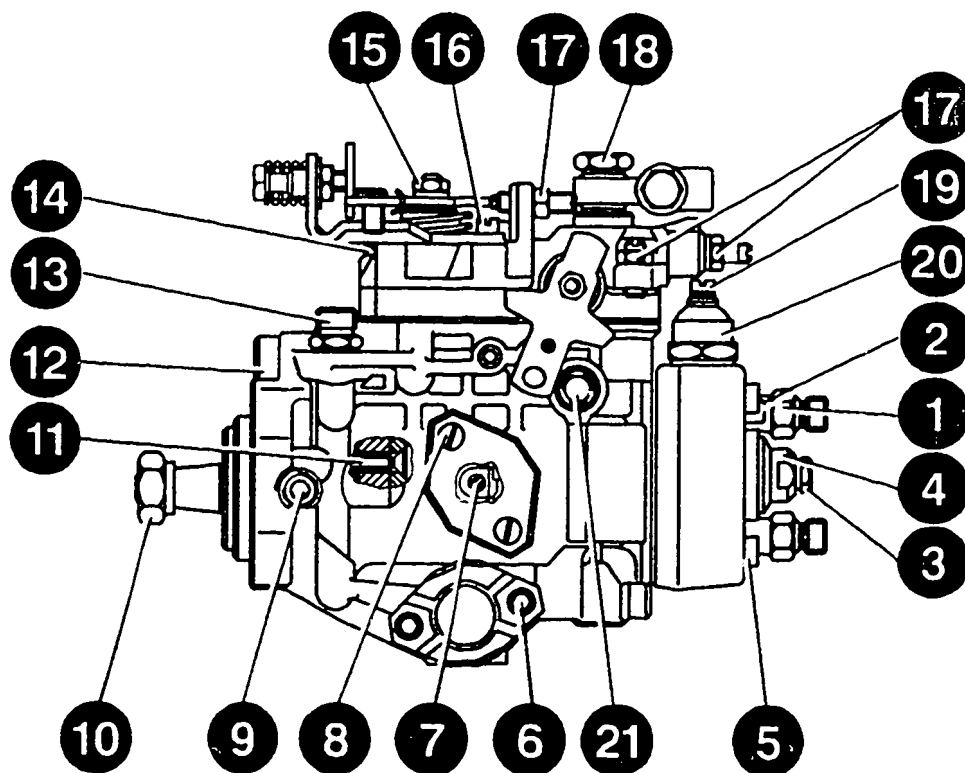


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TIGHTENING TORQUES FOR PUMP WITHOUT ADD-ON MODULE

- 13 = Tube fitting / or inlet-union screw 20..30 Nm
- 14 = Hexagon-socket-head cap screw / fillister-head screw 7..10 Nm
- 15 = Fastening nut for all control levers 5..10 Nm
- 16 = Hexagon-socket-head cap screw / fillister-head screw 7..10 Nm
- 17 = Hexagon nut 6.. 9 Nm
- 18 = Overflow restrictor Nm
- 19 = Hexagon nut / fillister-head screw 1.5..2.5 Nm
- 20 = Solenoid valve 15..25 Nm
- 21 = Slotted shoulder screw 10..15 Nm

Continue: A16/1 Fig.: A15/2

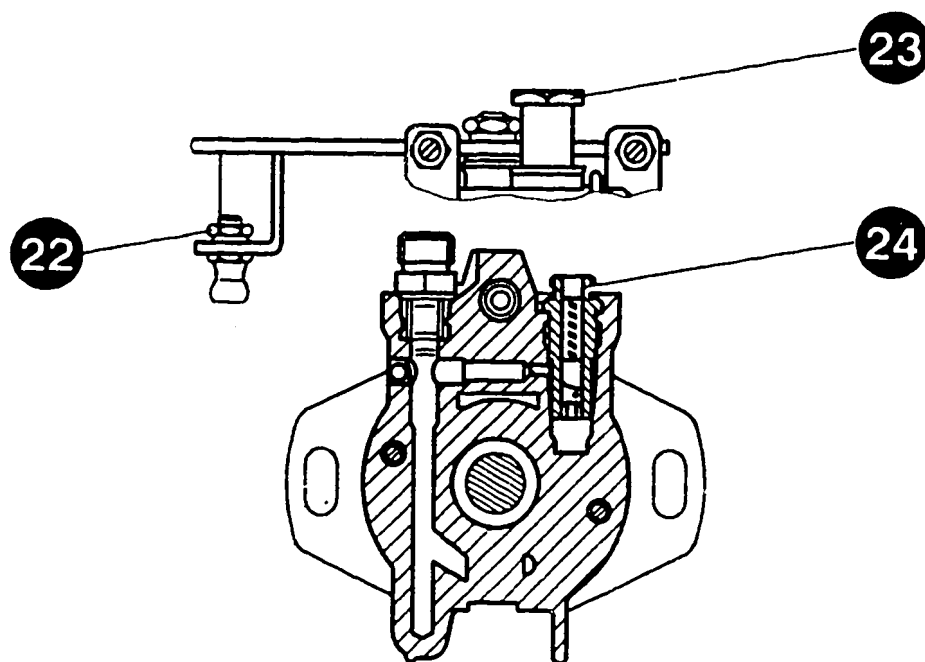


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TIGHTENING TORQUES FOR PUMP WITHOUT ADD-ON MODULE

22 = Hexagon nut	3.. 5 Nm
23 = Inlet-union screw with attached inlet union	20..30 Nm
24 = Pressure regulator	7..10 Nm

Continue: A17/1 Fig.: A16/2

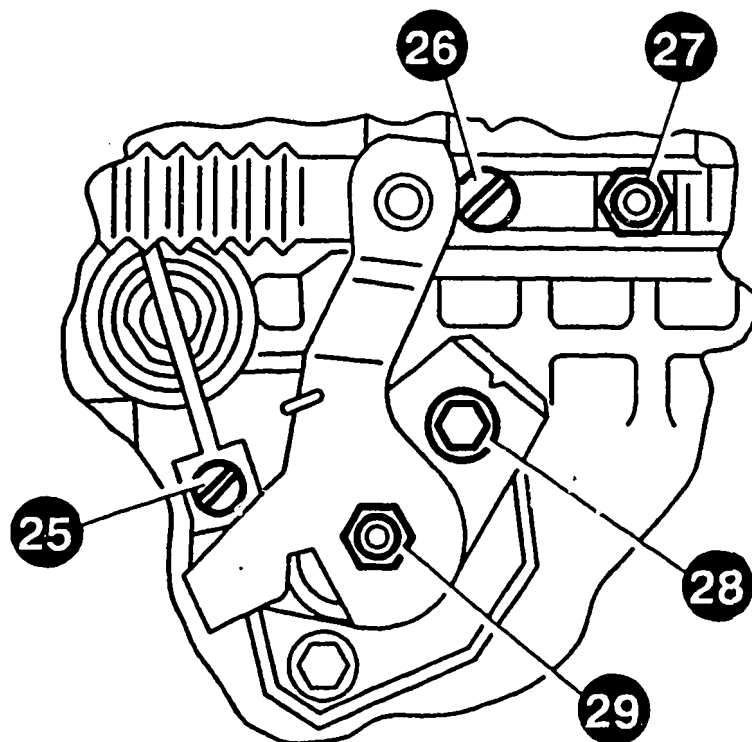


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**TIGHTENING TORQUES, PUMP WITH CAM
ROLLER RING
KSB COOLANT TEMPERATURE-CONTROLLED**

25 = Fillister-head screw	3.0..4.5Nm
26 = Fillister-head screw	0.5..1.0Nm
27 = Hexagon nut	3.5..4.5Nm
28 = Hexagon-socket-head cap screw	6.. 9 Nm
29 = Hexagon nut	5..10 Nm

Continue: A18/1 Fig.: A17/2



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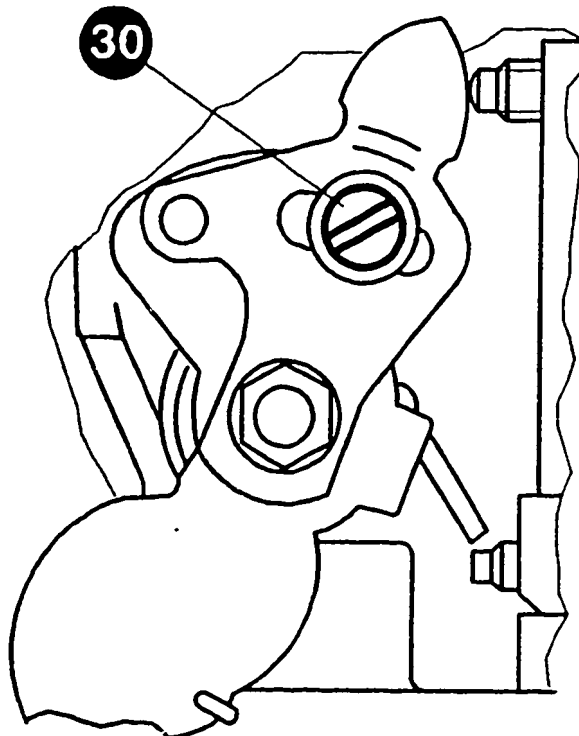
**TIGHTENING TORQUES, PUMP WITH 2-PIECE
SPEED-CONTROL LEVER**

**30 = Hexagon nut/fillister-head
screw**

6.. 9 Nm

Continue: A19/1 Fig.: A18/2

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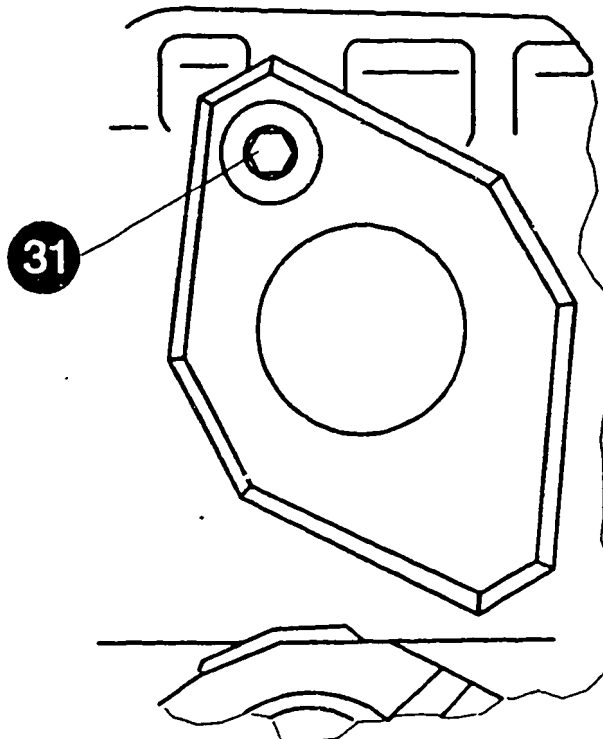
TIGHTENING TORQUES, PUMP WITH BLEEDER SCREW

31 = Bleeder screw

3.. 5 Nm

Continue: A20/1 Fig.: A19/2

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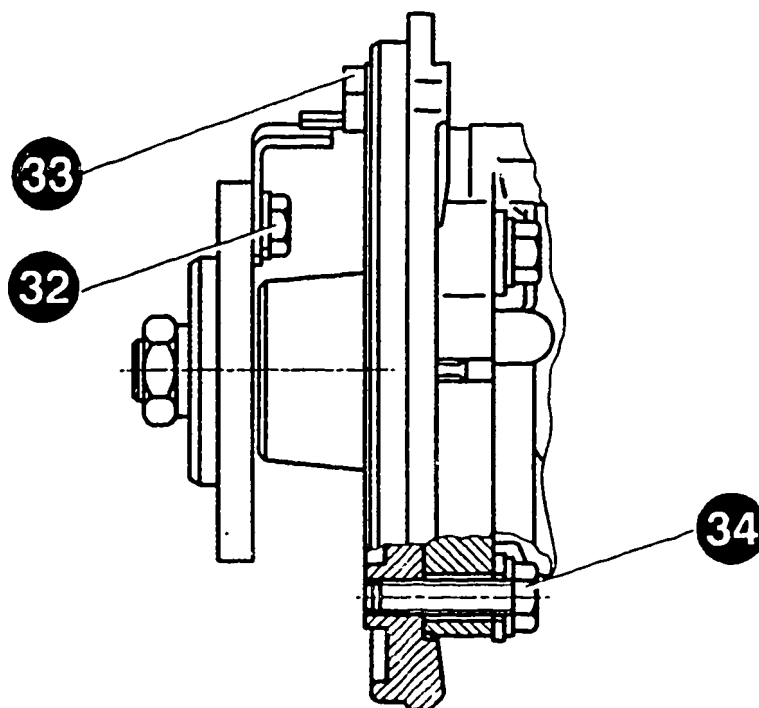


TIGHTENING TORQUES, PUMP WITH COUPLING HALF AND FLANGE

32 = Hexagon bolt	7..10 Nm
33 = Hexagon-socket-head cap screw	2.. 3 Nm
34 = Hexagon bolt	16..24 Nm

Continue: A21/1 Fig.: A20/2

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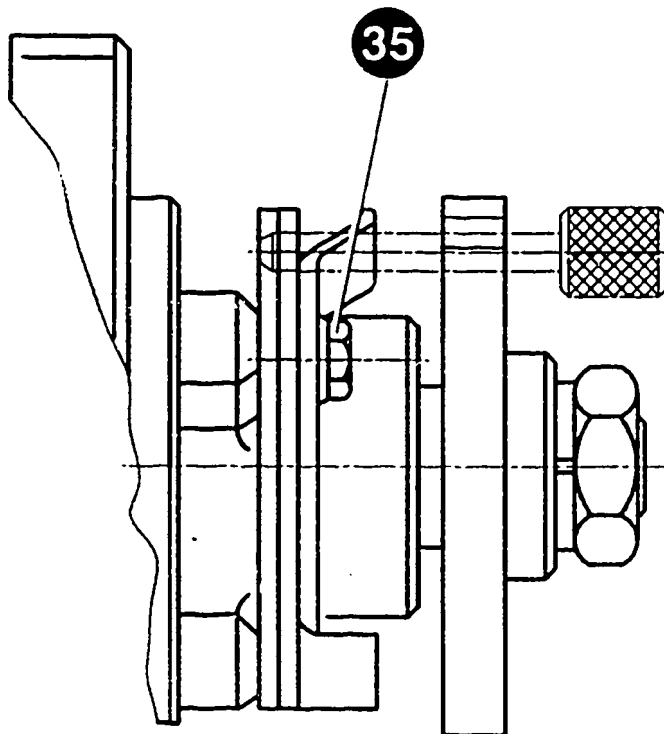


TIGHTENING TORQUES, PUMP WITH
COUPLING HALF AND FLANGE

35 = Hexagon bolt 4.0...6.0 Nm

Continue: A22/1 Fig.: A21/2

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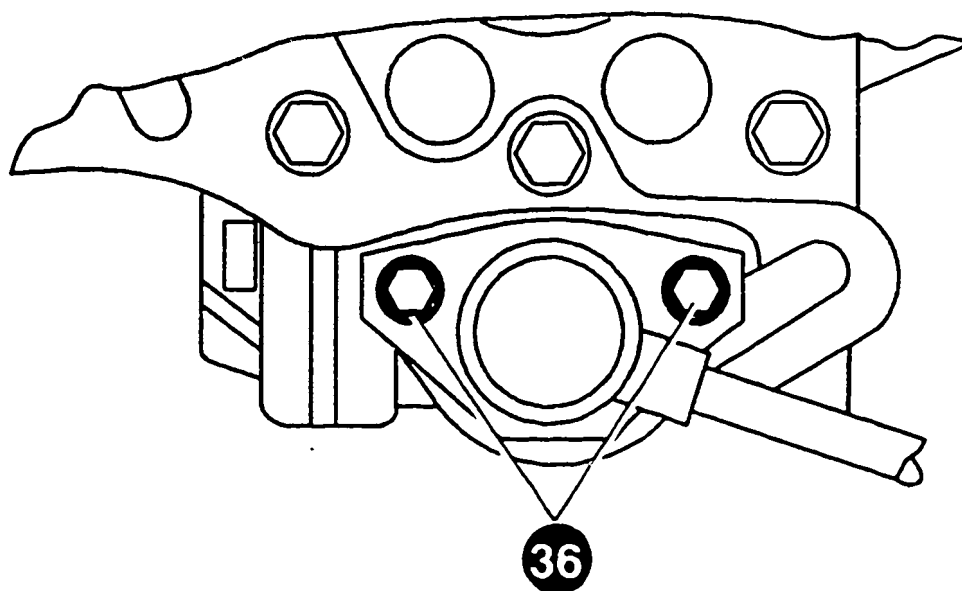


TIGHTENING TORQUES, PUMP WITH
FREQUENCY VALVE

36 = Fillister-head screw/Torx
bolt 10..14 Nm

Continue: A23/1 Fig.: A22/2

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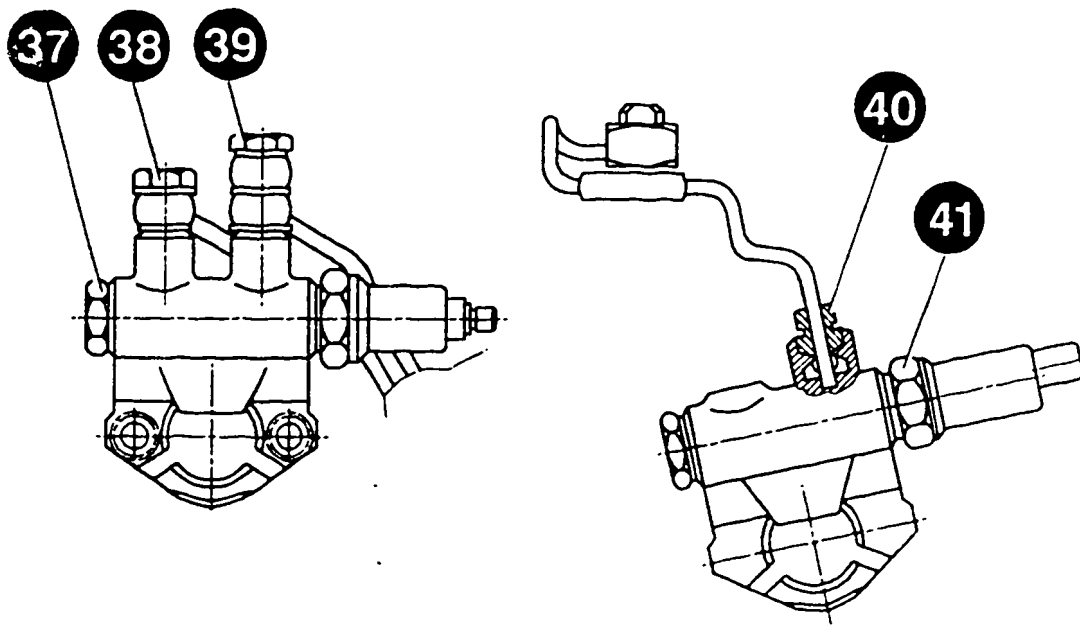


TIGHTENING TORQUES, PUMP WITH HYDRAULIC KSB

37 = Valve insert	10..15 Nm
38 = Inlet-union screw	8..12 Nm
39 = Inlet-union screw	8..12 Nm
40 = Cap screw	6..10 Nm
41 = Thermo-element	20..25 Nm

Continue: A24/1 Fig.: A23/2

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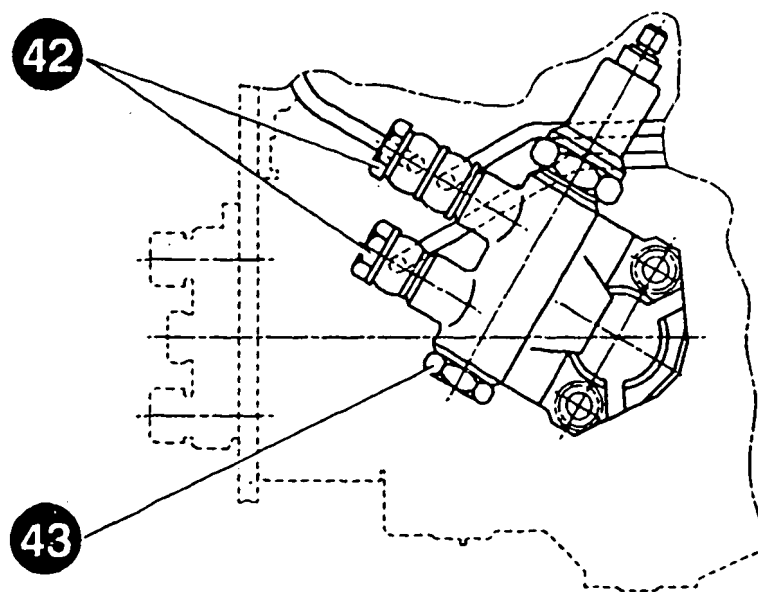


TIGHTENING TORQUES, PUMP WITH HYDRAULIC KSB

42 = Inlet-union screw	8.0...11.0 Nm
43 = Valve insert	10.0...15.0 Nm

Continue: A25/1 Fig.: A24/2

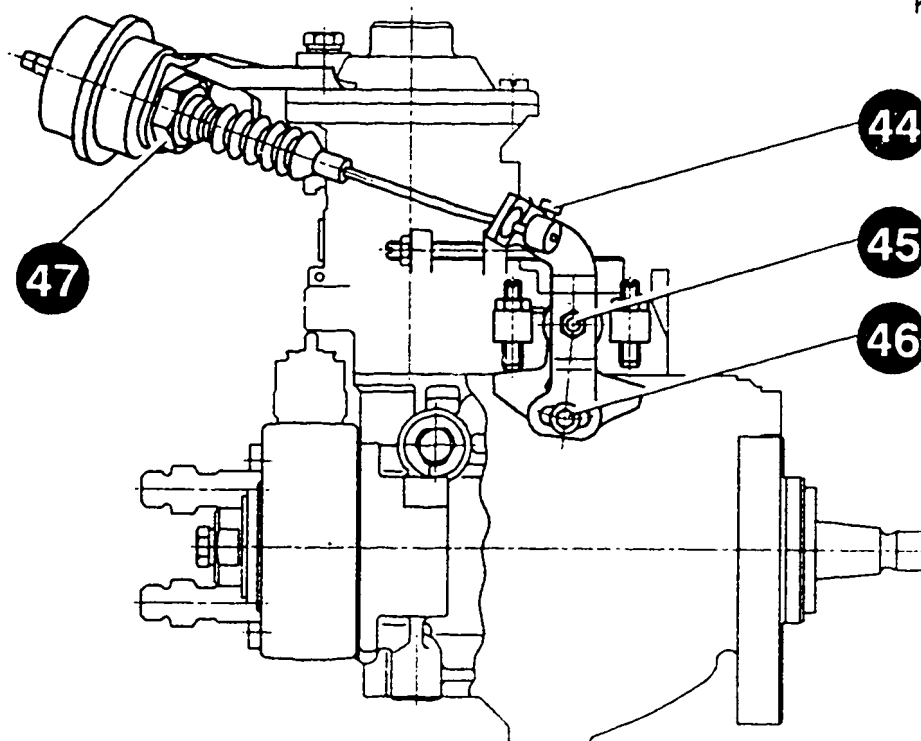
KMK03282



TIGHTENING TORQUES, PUMP WITH PNEUMATIC IDLE INCREASE (PLA)

44 = Slotted screw	2.0...3.0 Nm
45 = Hexagon bolt	3.0...5.0 Nm
46 = Hexagon bolt	5.0...7.0 Nm
47 = Fastening nut	20.0...25.0 Nm

Continue: A26/1 Fig.: A25/2



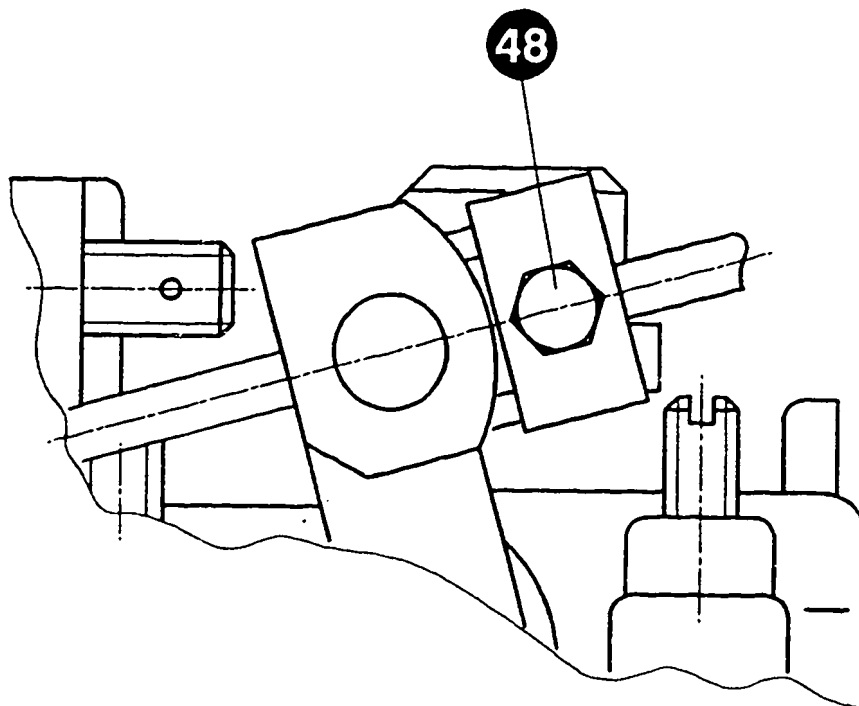
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TIGHTENING TORQUES, PUMP WITH
TEMPERATURE-DEPENDENT
IDLE INCREASE (TLA)

48 = Hexagon bolt 2.0...3.0 Nm

Continue: A27/2 Fig.: A26/2

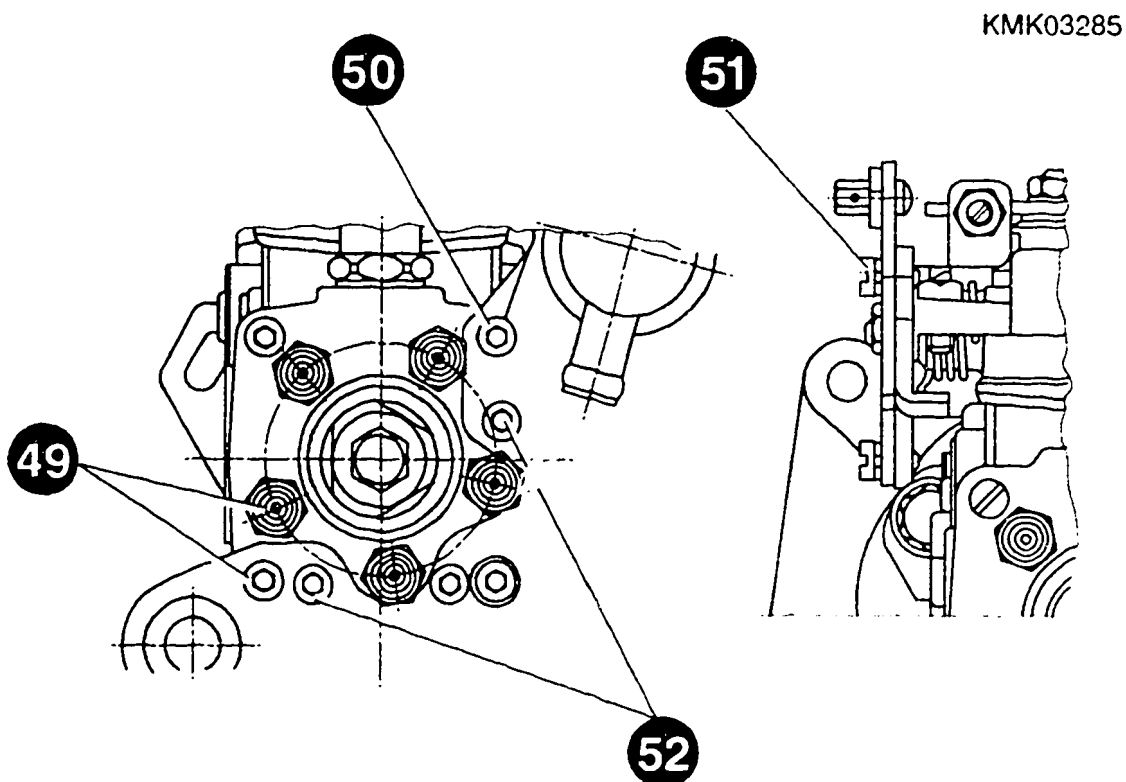
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TIGHTENING TORQUES, PUMP WITH MOUNTING PLATE

49 = Torx bolt	10...14 Nm
50 = Torx bolt	10...14 Nm
51 = Fillister-head screw	3... 5 Nm
52 = Hexagon-socket-head cap screw	7...10 Nm

Continue: A28/1 Fig.: A27/2



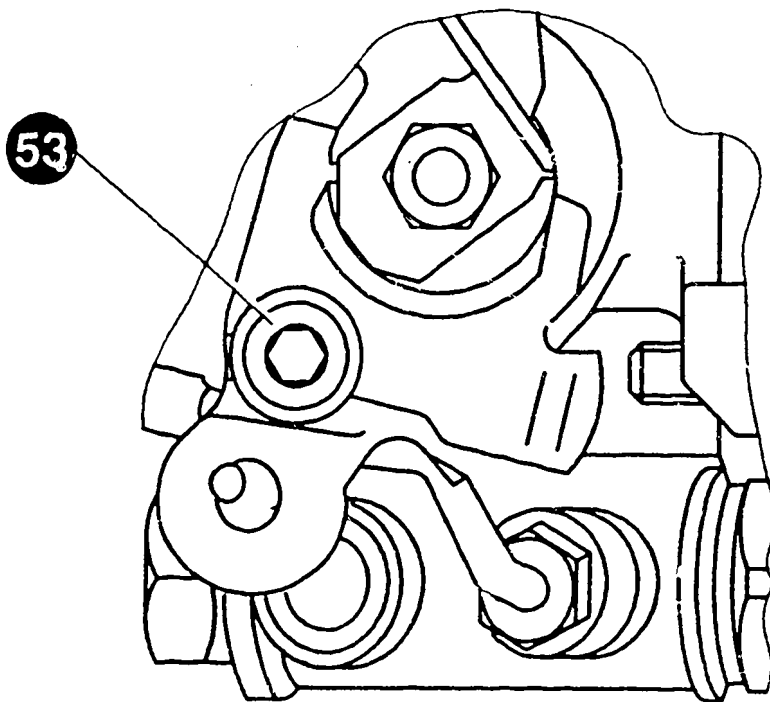
TIGHTENING TORQUES, PUMP WITH
ANCILLARY LEVER FOR SPRING-ACTUATED
POWER ON/OFF DAMPER

53 = Fastening screw

6... 9 Nm

Continue: B01/1 Fig.: A28/2

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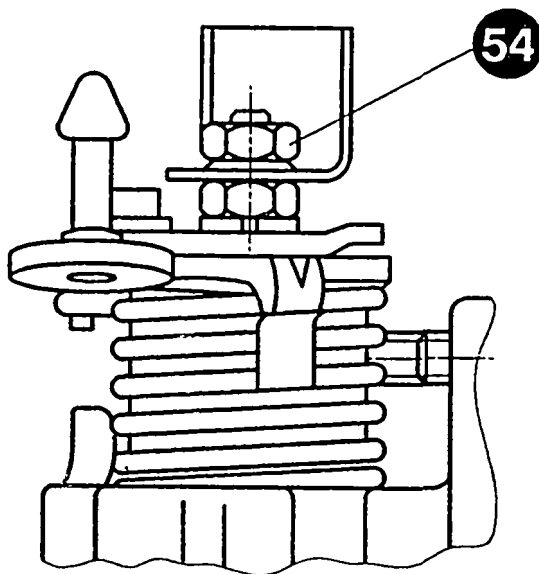
TIGHTENING TORQUES, PUMP WITH STOP
BRACKET FOR SWITCHING VALVE ADJUSTMENT

54 = Hexagon nut

5...10 Nm

Continue: B02/2 Fig.: B01/2

KMK03287



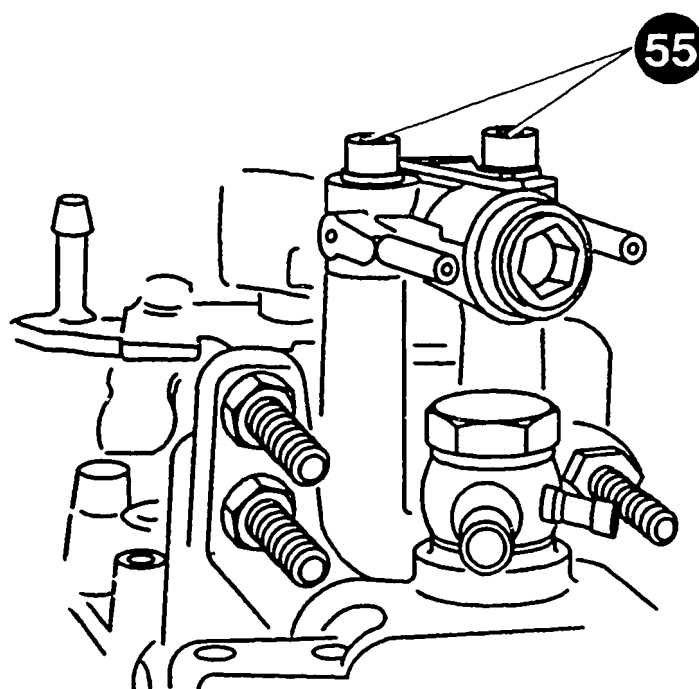
TIGHTENING TORQUES, PUMP WITH SWITCHING VALVE

55 = Torx bolt M5

2... 3 Nm

Continue: C01/2 Fig.: B02/2

KMK03288



COMPONENT REPAIR

Select component repair in line with following characteristics:

* Central screw plug	C02/1
* Overflow restriction	C03/1
* Solenoid valve	C04/1
* Speed-control lever	C05/1
* Leakage at delivery-valve holder	C06/1
* Renewing radial-lip-type oil seal	C07/1
* Timing-device seal rings	C08/1
* Renewing housing cover seal, control lever bearing	C09/1
Complete repair	D04/1

Continue: C02/2

TESTING CENTRAL SCREW PLUG

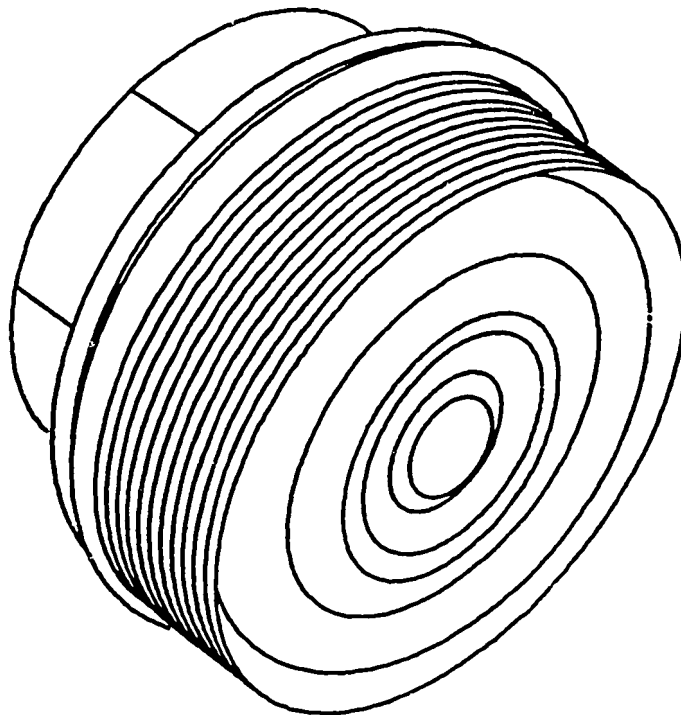
Check tightening torque in the event of leaks at the central screw plug.

Desired, max. 70 ... 90 Nm.

If tightening torque is correct, central screw plug is to be renewed (internal leakage).

Continue: C01/1 Fig.: C02/2

KMK03289



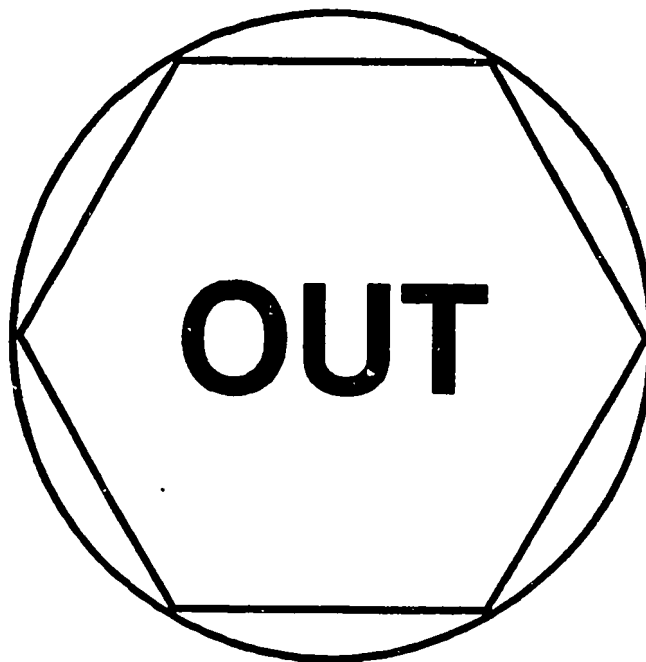
TESTING OVERFLOW RESTRICTION

Screw out overflow restriction at fuel-injection pump (marked "out"). Visually inspect built-in strainer for dirt.

Renew overflow restriction in the event of doubt.

Continue: C01/1 Fig.: C03/2

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TESTING FUNCTION OF SOLENOID VALVE

Remove fuel-injection tubing and take out solenoid valve.

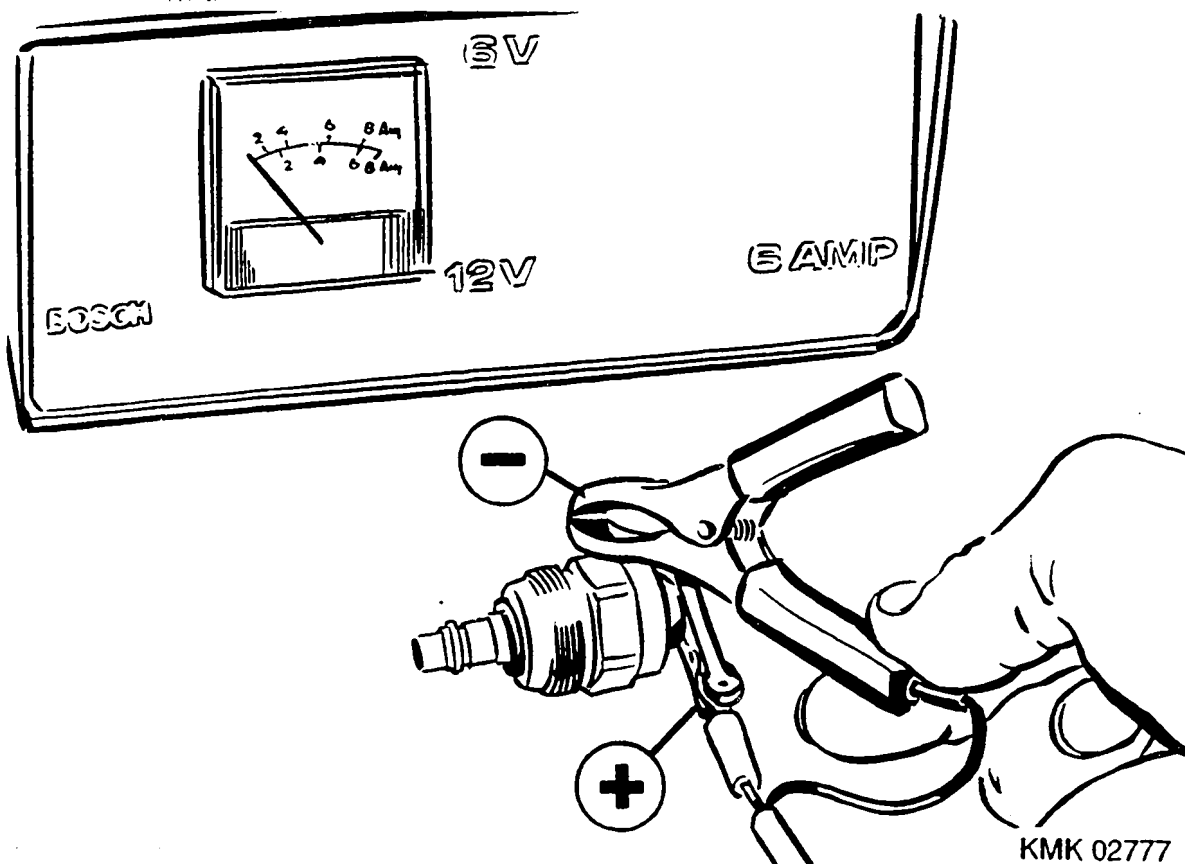
Ensure cleanliness!

Check function of solenoid valve following removal (see picture).

Note:

After it has been removed, solenoid valve may only be briefly supplied with voltage since there is no fuel cooling.

Continue: C01/1 Fig.: C04/2



SPEED-CONTROL LEVER STIFF

The problem is caused by a lack of lubrication at cylindrical helical coiled spring, stop bushing and cover. The grease may have been washed out of these components for example when washing engine.

If this is the case, control lever, cylindrical helical coiled spring and stop bushing must be thoroughly re-greased with multi-grade lubricant (it is also possible to use engine oil as a lubricant).

Continue: C01/1

LEAKAGE AT DELIVERY-VALVE HOLDER AND BLEEDER SCREW

Loosen delivery-valve holder and tighten it to prescribed tightening torque 38 ... 42 Nm.

If delivery-valve holder still leaks, renew appropriate holder and gasket.

NOTE

Re-install delivery-valve assemblies with springs and shims in same distributor outlet.

Only use torque wrench to tighten delivery-valve holder.

Continue: C06/2

Renew seal if bleeder screw is leaking.

Tighten bleeder screw to tightening torque of 20 ... 26 Nm.

Continue: C01/1

RENEWING RADIAL-LIP-TYPE OIL SEAL

Use extractor KDEP 1113 or KDEP 1114 to pull radial-lip-type oil seal out of pump housing.

Attach assembly sleeve KDEP 2939 to drive shaft.

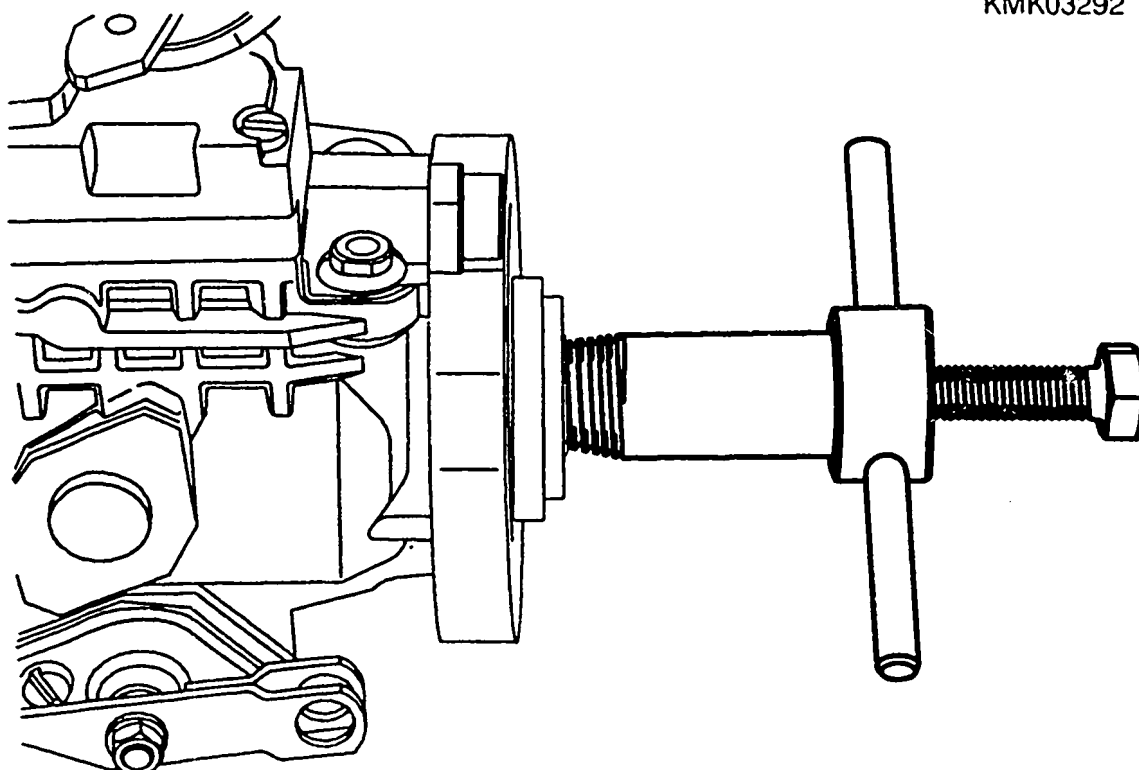
Install new radial-lip-type oil seal with mandrel press.

NOTE

Take care not to damage sealing lip and seal-ring spring.

Continue: C01/1 Fig.: C07/2

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RENEWING TIMING-DEVICE SEALS

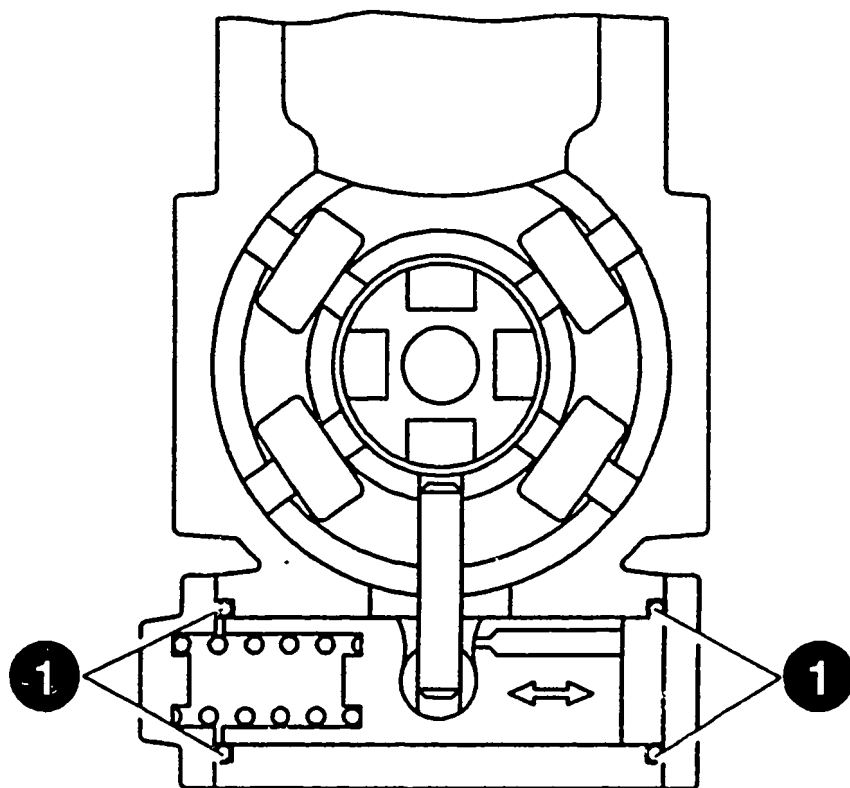
1 = O-rings

Disassemble timing-device cover.
Examine O-rings for damage.
Replace damaged O-ring.

Re-install timing-device cover.

Note: If delivery end of timing device
is provided with KSB, this must be
removed first.

Continue: C01/1 Fig.: C08/2

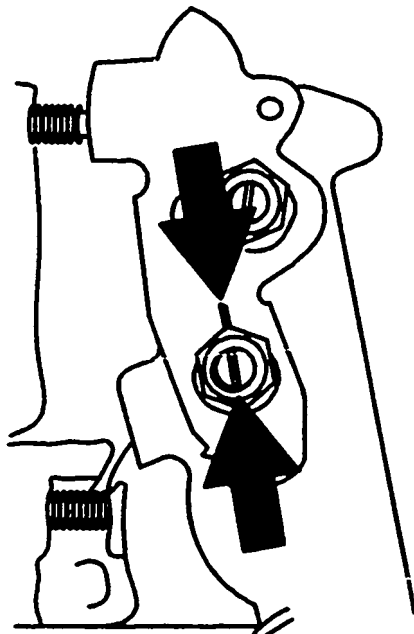


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**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

Remove overflow restriction and drain
distributor-type fuel-injection pump.
Attach distributor-type fuel-injection
pump with flange and support clamp
KDEP 2963 to clamping support
KDEP 2919.
Mark control lever and setting shaft
with respect to one another (arrows).

Continue: C10/1 Fig.: C09/2



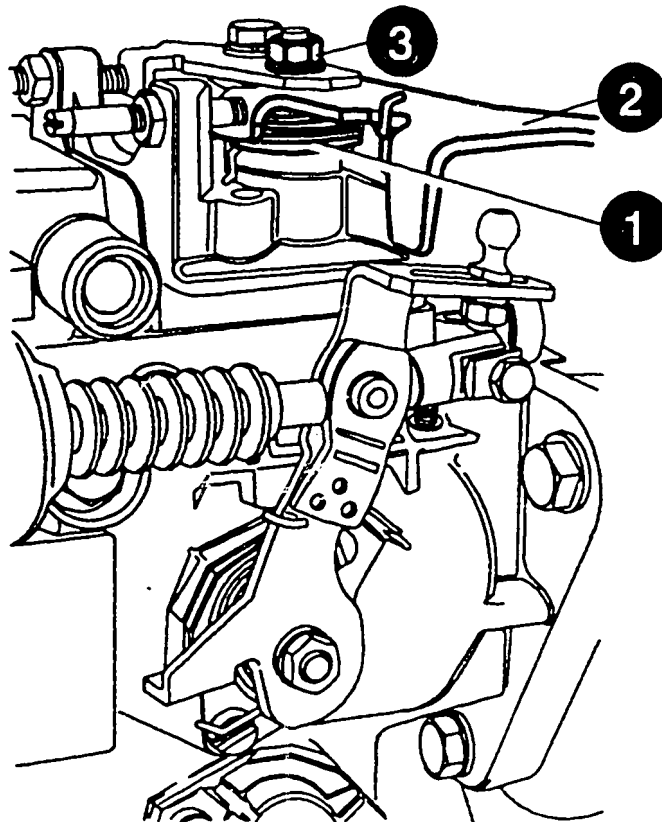
KMK02289

**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

- 1 = Cylindrical helical coiled spring**
- 2 = Control lever**
- 3 = Hexagon nut with spring lock washer**

**Disengage cylindrical helical coiled
spring.
Remove hexagon nut with spring lock
washer.
Pull off control lever.
Remove fastening screws of housing
cover.**

Continue: C11/1 Fig.: C10/2



KMK03294

RENEWING HOUSING COVER SEAL, CONTROL LEVER BUSHING AND O-RING ON CONTROL LEVER SHAFT

1 = Extension spring

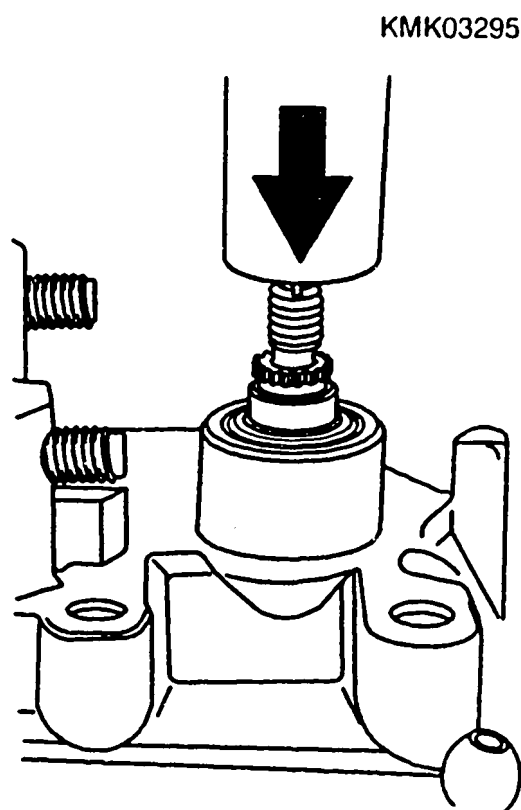
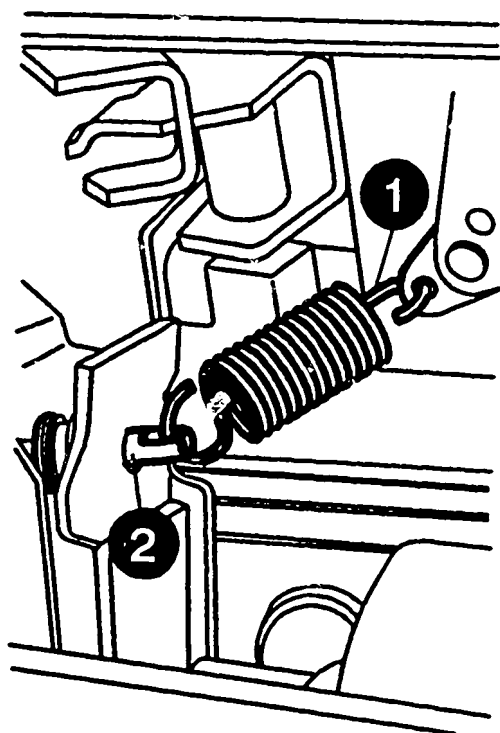
2 = Retaining pin with compression spring

Raise housing cover and disengage extension spring from retaining pin.

Set down retaining pin with compression springs. Disengage extension spring from setting shaft.

Press through setting shaft in direction of inside of cover.

Continue: C12/1 Fig.: C11/2



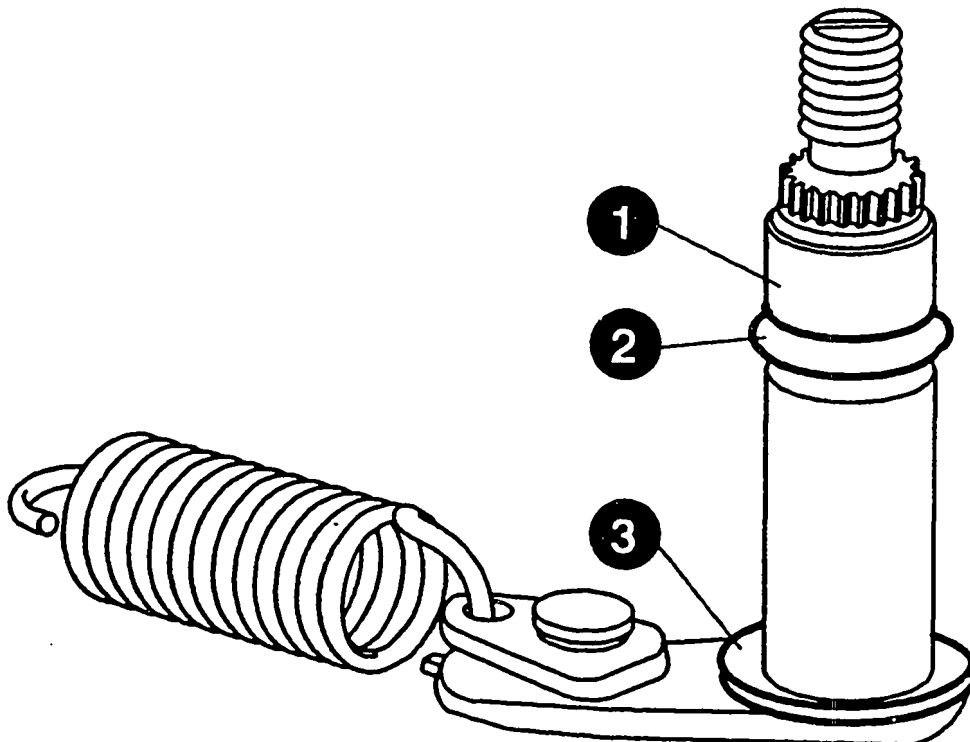
**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

- 1 = Setting shaft**
- 2 = O-ring**
- 3 = Washer**

**Remove O-ring and shim from setting
shaft. Remove housing cover. Take seal
ring out of housing cover.**

Continue: C13/1 Fig.: C12/2

KMK03296



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Remove full-load screw

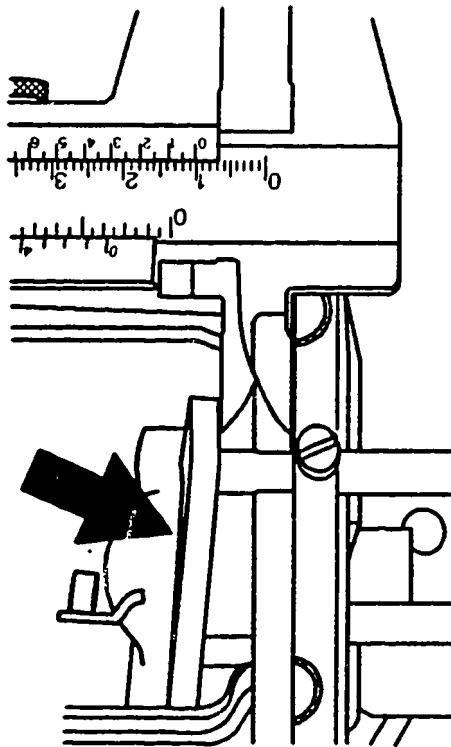
Remove full-load screw if necessary.
Before removing full-load screw,
measure screw-in depth with KDEP
1152/3 and note down dimension.

NOTE:

New full-load screw is set to measured
dimension again on assembly.

Continue: C14/1 Fig.: C13/2

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RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

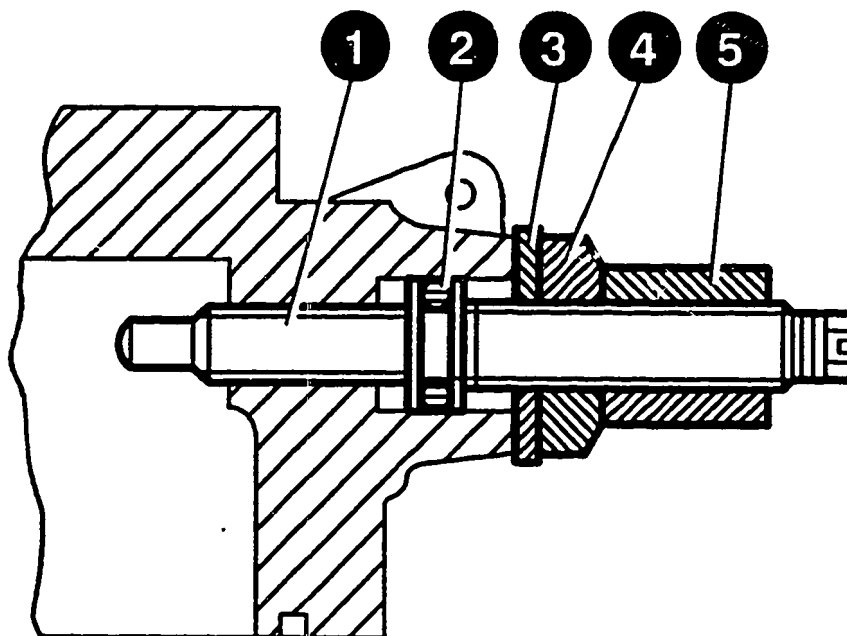
* Remove full-load screw

- 1 = Threaded pin (full-load adjusting
screw)
- 2 = O-ring
- 3 = Washer
- 4 = Hexagon nut
- 5 = Retaining sleeve

Remove threaded pin with hexagon nut,
washer, retaining sleeve and O-ring.

Continue: C15/1 Fig.: C14/2

KMK03298



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

Select further repairs in line with
following features:

- * Remove pump with temperature-
dependent excess fuel quantity
regulator (TAS) C16/1
- * Pump with no TAS C18/1

Continue: C16/1

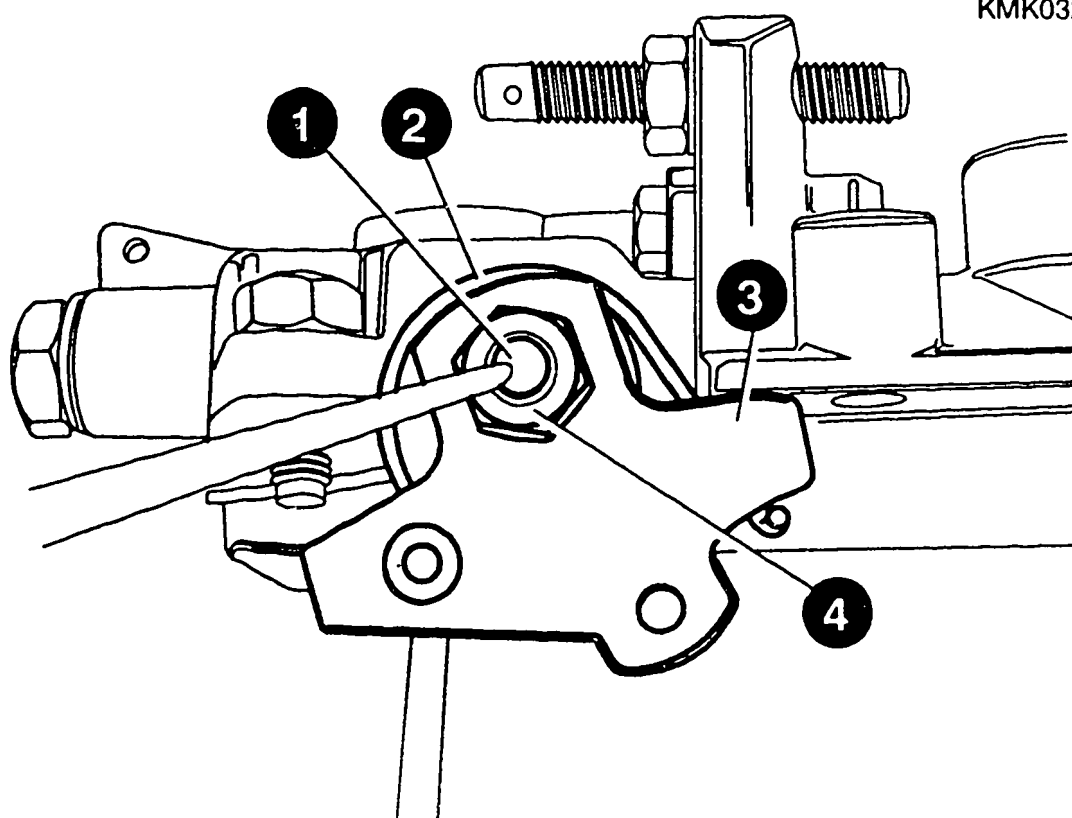
RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Remove TAS

- 1 = Lever shaft
- 2 = Cylindrical helical coiled spring
- 3 = Regulating lever
- 4 = Hexagon nut with spring lock washer

Remove temperature-dependent excess
fuel quantity restrictor (TAS).
Disengage cylindrical helical coiled
spring (if appropriate). Mark position
of regulating lever/stop lever in the
case of mechanical stop with respect
to lever shaft (see picture).
Remove hexagon nut with spring lock
washer. Pull off regulating lever.

Continue: C17/1 Fig.: C16/2



KMK03299

**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

*** Remove TAS**

1 = Lever shaft

2 = Shims

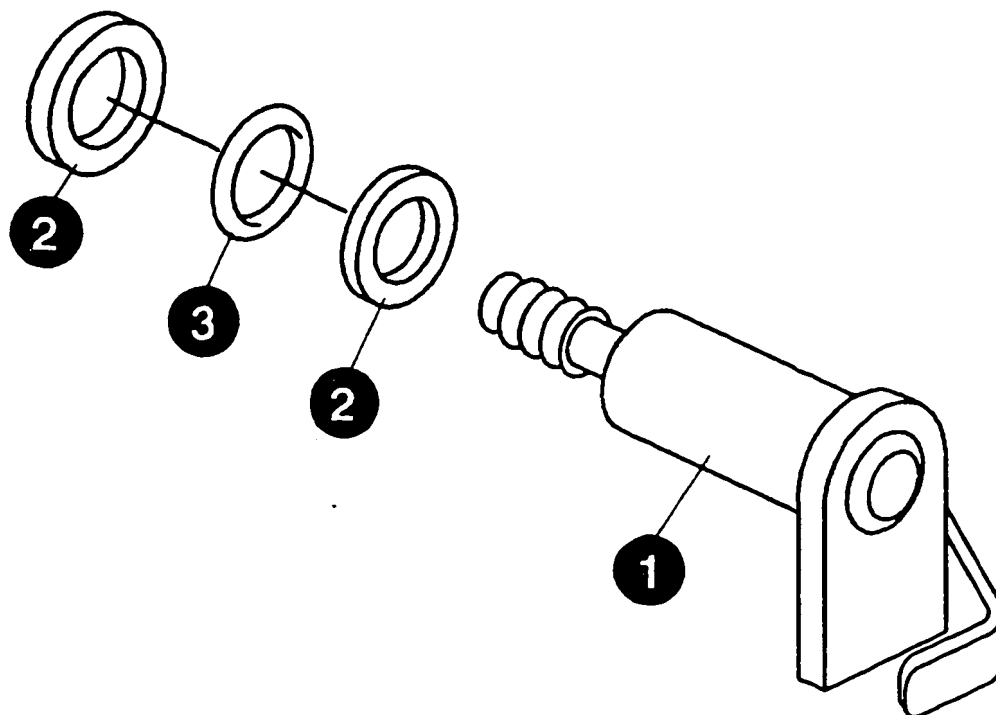
3 = O-ring

Pull lever shaft out of housing cover.

Remove shims and O-ring.

Continue: C18/1 Fig.: C17/2

KMK03300

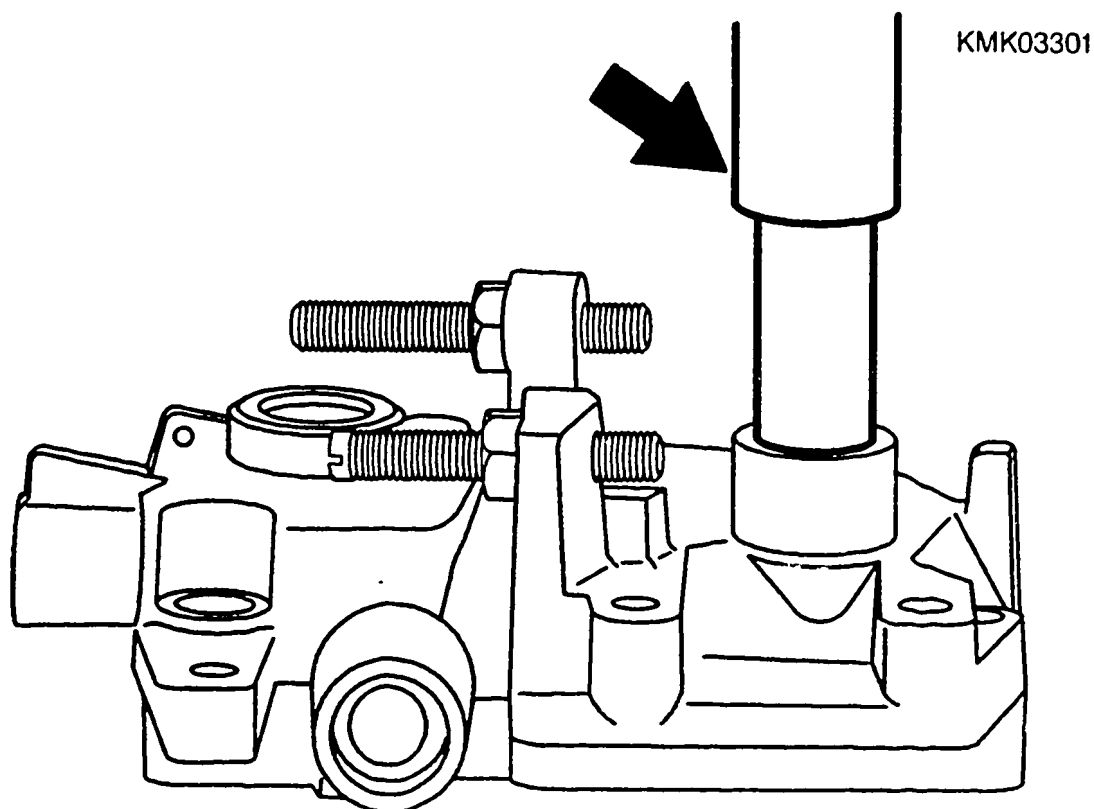


RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* REPLACEMENT OF BUSHING IN HOUSING
COVER

Press out bronze bushing with
appropriate mandrel KDEP 1132/0/1
(arrow). Wash out housing cover; there
must be no grease in hole for bushing.
Examine hole in housing cover for
longitudinal scoring or similar damage.
Use new housing cover if freedom from
leaks between bushing and housing
cover hole does not appear to be
guaranteed.

Continue: C19/1 Fig.: C18/2



RENEWING HOUSING COVER SEAL, CONTROL LEVER BUSHING AND O-RING ON CONTROL LEVER SHAFT

* REPLACEMENT OF BUSHING IN HOUSING COVER

A = Height of collar

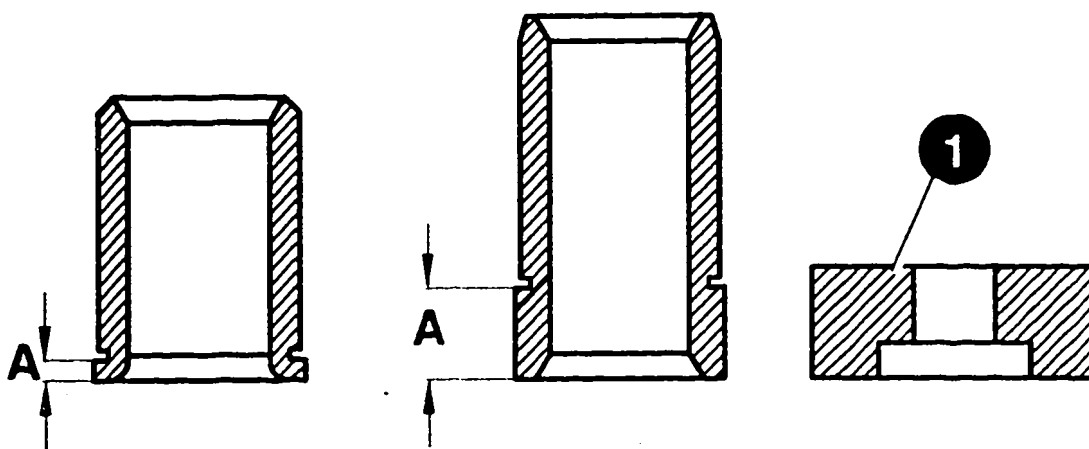
1 = Spacer

Place spacer with countersink in
correct position on housing cover in
line with steel-bushing design (2.5
or 7.0 mm collar height).

2.5 mm collar: countersink towards
pressing-in mandrel; 7.0 mm collar:
countersink towards housing.

Continue: C20/1 Fig.: C19/2

KMK03302



RENEWING HOUSING COVER SEAL, CONTROL LEVER BUSHING AND O-RING ON CONTROL LEVER SHAFT

* REPLACEMENT OF BUSHING IN HOUSING COVER

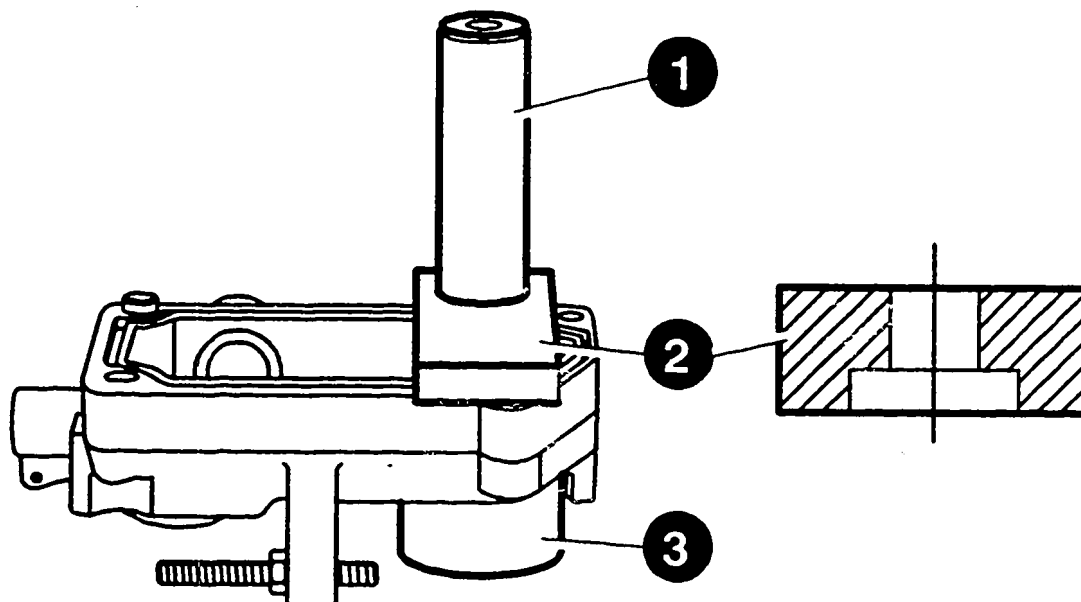
- 1 = Pressing-in mandrel
- 2 = Spacer
- 3 = Support ring

Place housing cover on support ring.
Apply "Loctite 582" to O.D. of steel
bushing.

Press in steel bushing with
pressing-in mandrel straight and flush
until it makes contact with pin in
countersink or spacer.

Continue: C21/2 Fig.: C20/2

KMK03303



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* HOUSING COVER ASSEMBLY

Select further assembly in accordance
with following features:

* Pump with variable-speed
governor C22/1

* Pump with part-load governor
Version with detachment
surfaces C25/1

With no detachment surfaces C26/1

Continue: C22/1

**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

*** Pump with variable-speed governor**

- 1 = Retaining pin**
- 2 = Tensioning lever**
- 3 = Governor spring**

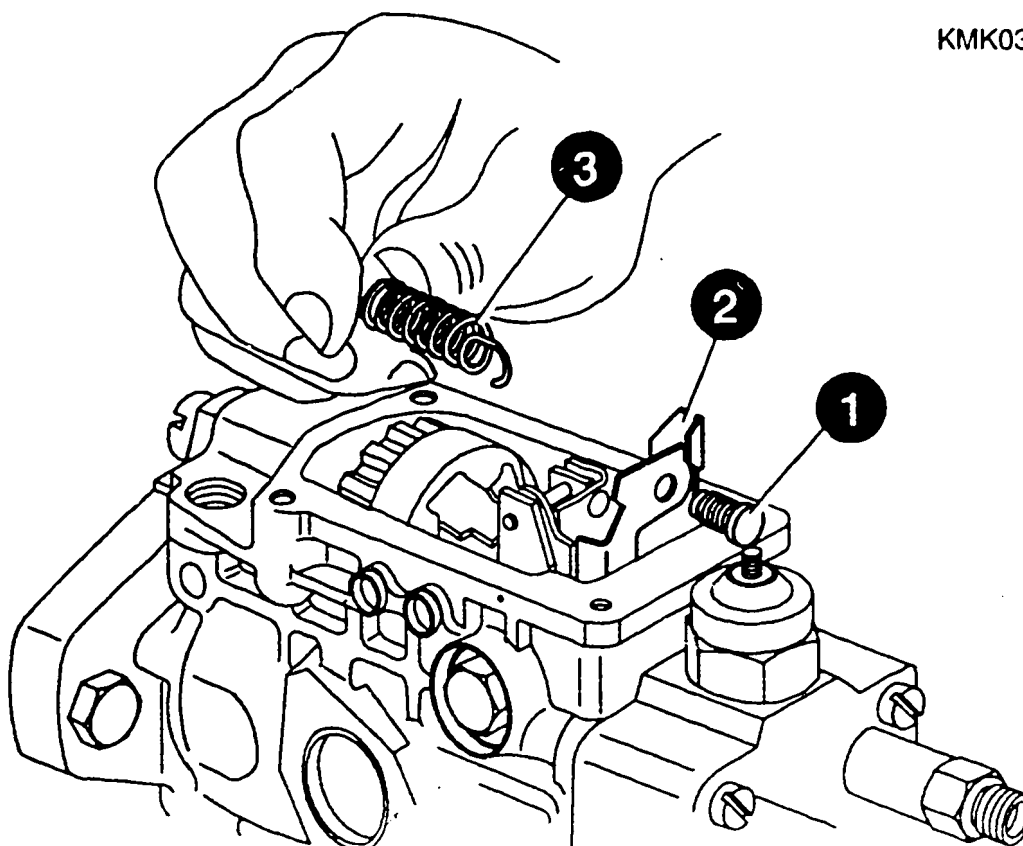
**Engage governor spring in retaining
pin of tensioning lever.**

Note:

**Retaining pin and compression spring
are to be viewed as one unit and may
only be replaced together (parts set).**

Continue: C23/1 Fig.: C22/2

KMK03304



**RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT**

*** Pump with variable-speed governor**

1 = Shim

2 = O-ring

**Attach shim and O-ring to control
lever shaft.**

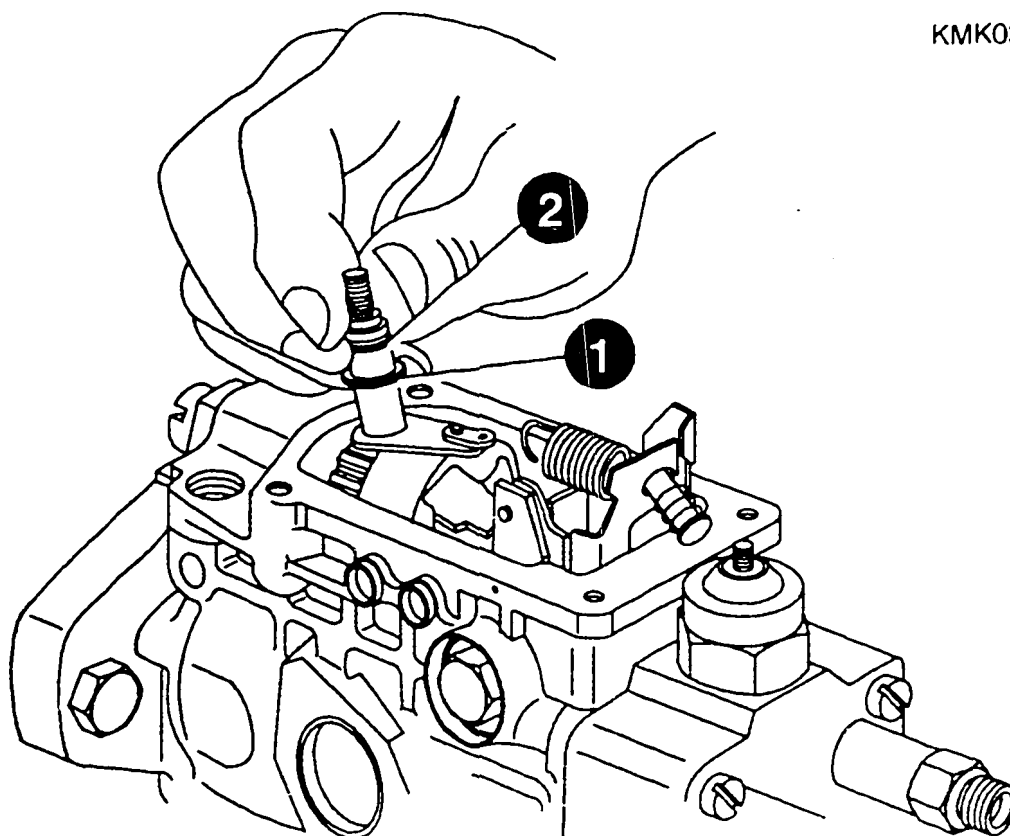
**Engage governor spring on joint of
setting shaft.**

**Make sure that eyelet opening faces
downwards.**

**Grease O-ring of setting shaft before
installing setting shaft in governor
cover.**

Continue: C24/1 Fig.: C23/2

KMK03305



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Pump with variable-speed governor

Screw in full-load stop screw (if
removed) with O-ring.

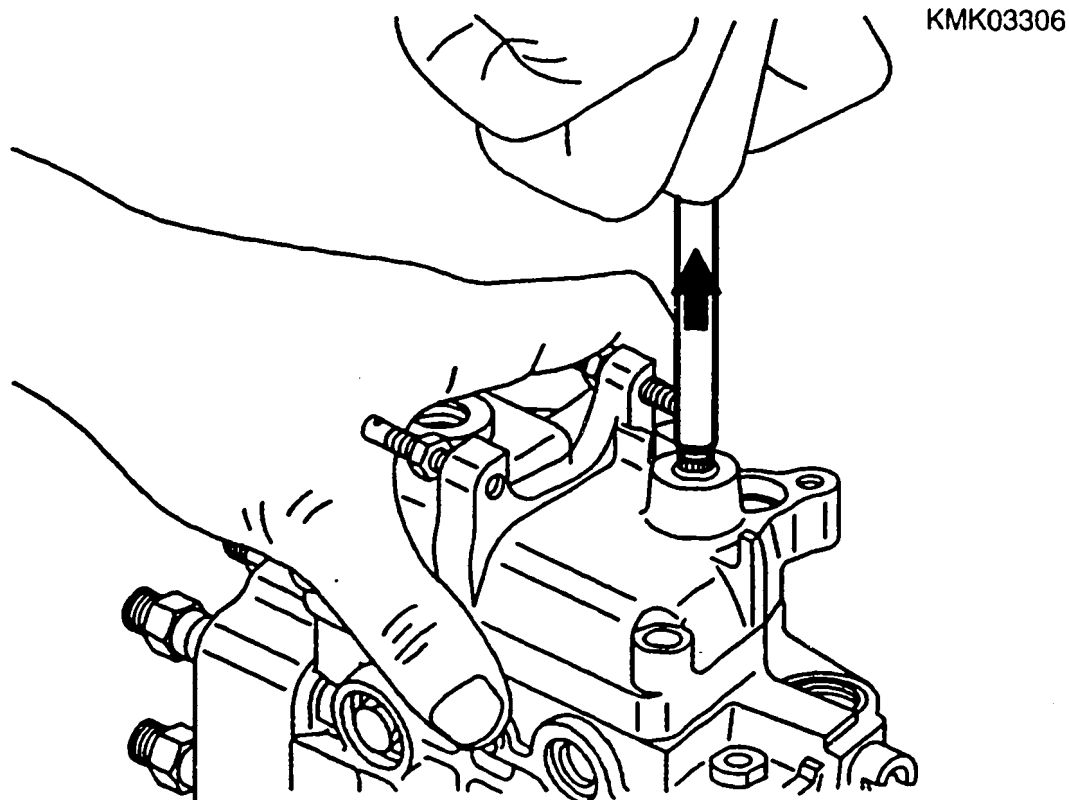
Screw in full-load screw to screw-in
depth (determined on removal) with KDEP
1152/3.

Place housing cover with new seal on
pump housing.

Pull setting shaft with assembly
wrench KDEP 1096 through housing cover
(arrow).

Secure housing cover.

Continue: D01/1 Fig.: C24/2



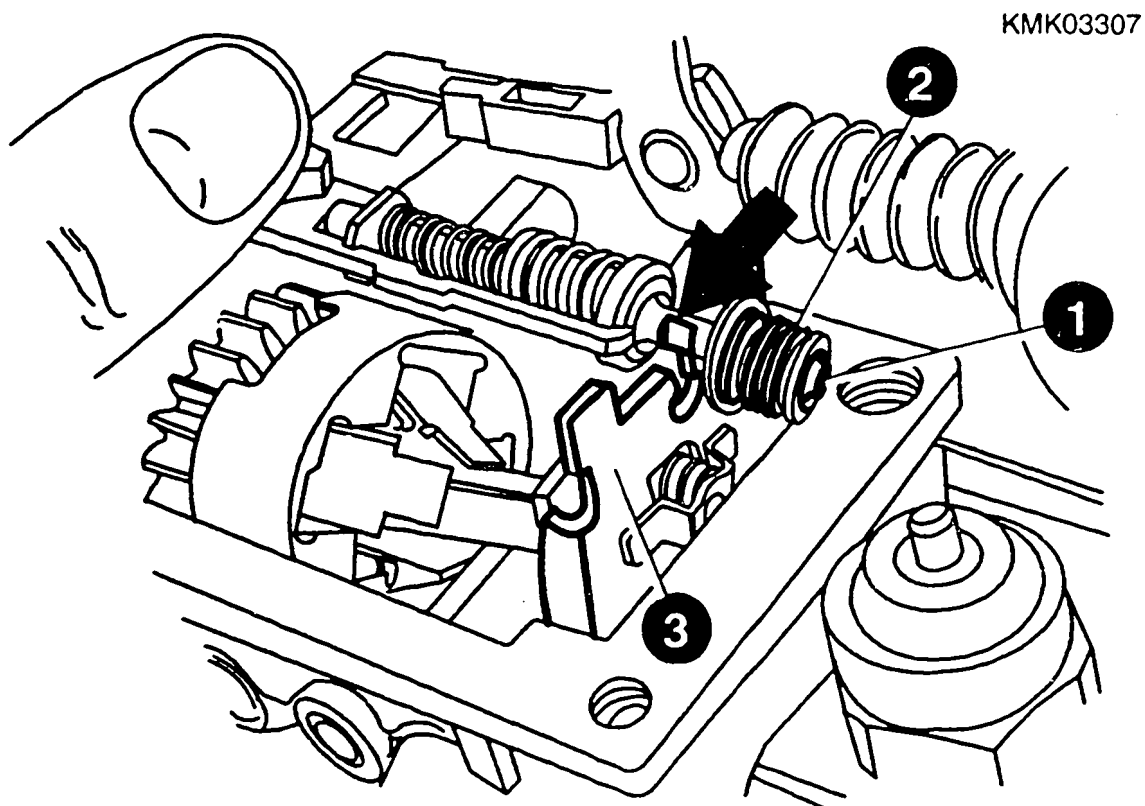
RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Pump with part-load governor
Version with detachment surfaces

- 1 = Retaining pin
- 2 = Intermediate spring
- 3 = Tensioning lever

Engage milled surfaces (arrow) of
part-load governor in part-load
governor such that retaining pin and
intermediate spring are behind
tensioning lever.

Continue: C27/1 Fig.: C25/2



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Pump with part-load governor

Version with no detachment surfaces

1 = Retaining ring

2 = Retaining pin

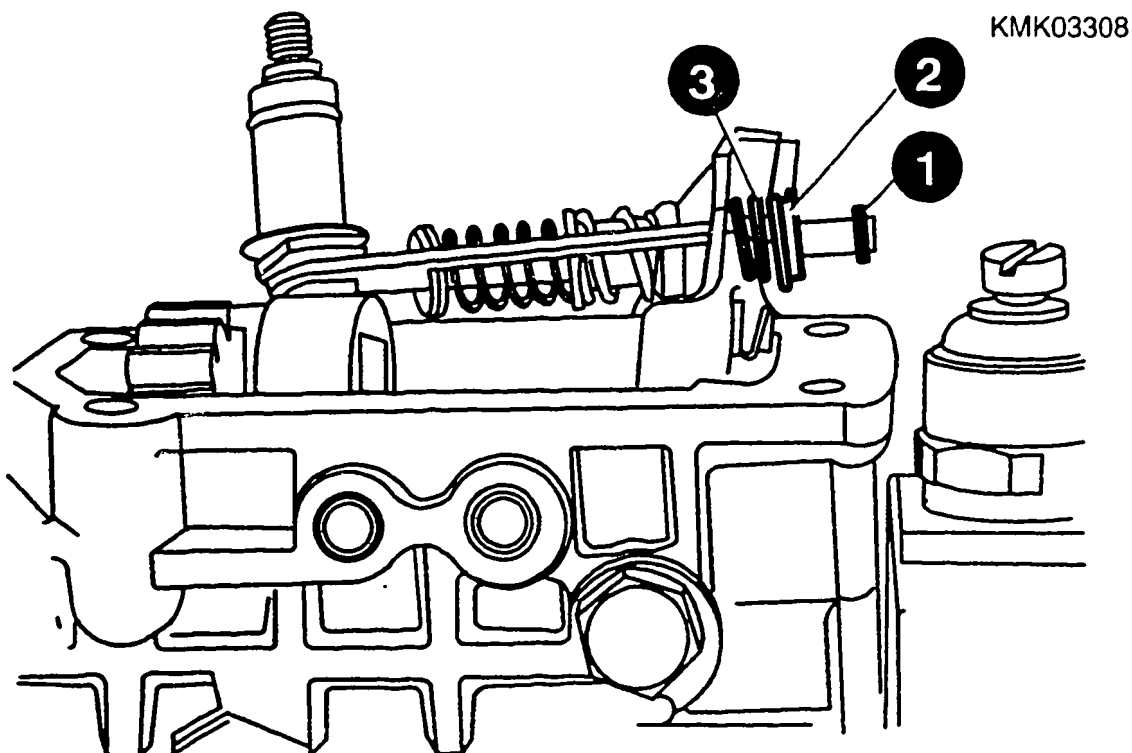
3 = Intermediate spring

Insert part-load governor with setting
shaft into fulcrum lever assembly.

Slip intermediate spring and retaining
pin onto guide pin (part-load
governor).

Attach retaining ring to guide pin.

Continue: C27/1 Fig.: C26/2



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Pump with part-load governor

- 1 = O-ring
- 2 = Setting shaft
- 3 = Shim

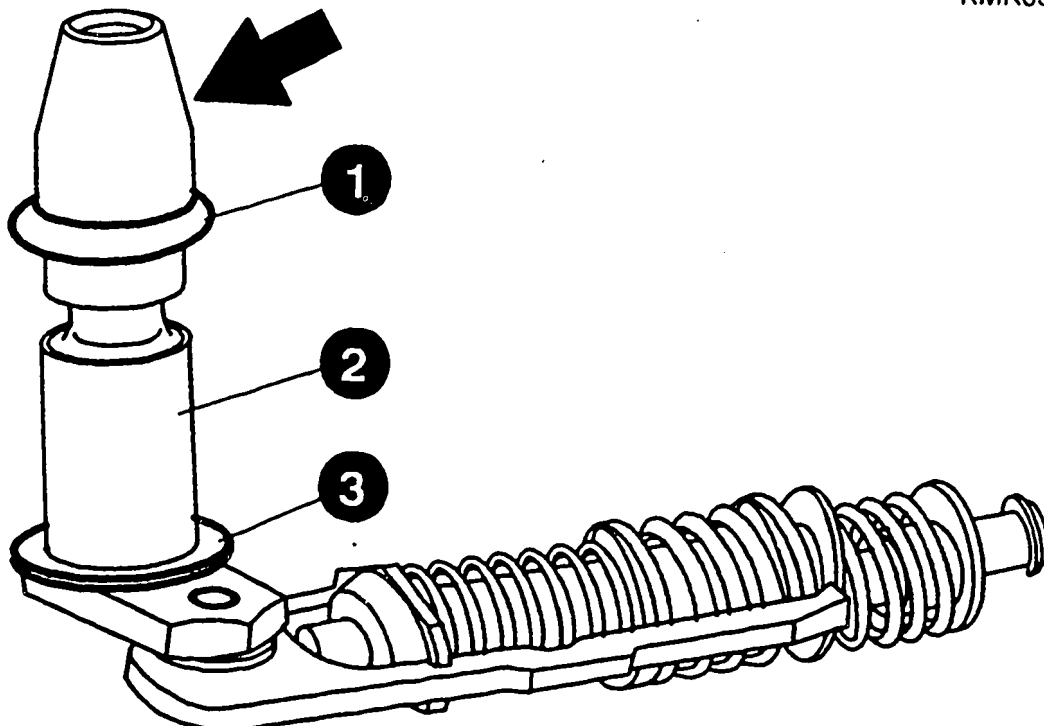
Fit shim.

Install assembly sleeve KDEP 2937 on
setting shaft to protect O-ring.

Slip on O-ring.

Continue: C28/1 Fig.: C27/2

KMK03309



RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Pump with part-load governor

Screw in full-load stop screw (if
removed) with O-ring.

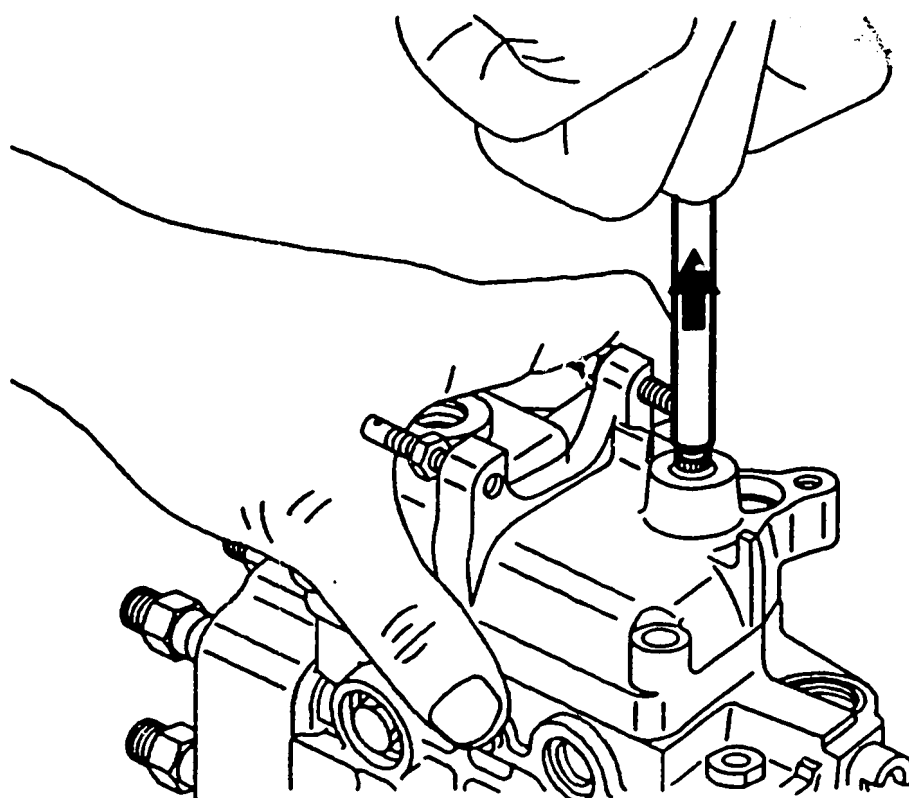
Screw in full-load stop screw to
screw-in depth (determined on removal)
with KDEP 1152/3.

Attach housing cover with new seal to
pump housing.

Pull assembly shaft with assembly
wrench KDEP 1096 through housing cover
(arrow).

Secure housing cover.

Continue: D01/1 Fig.: C28/2



KMK03306

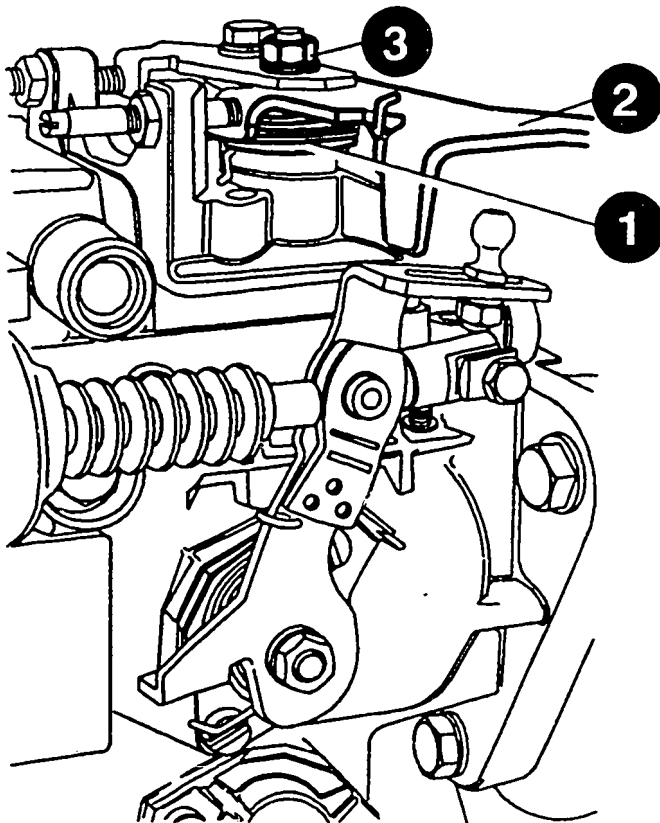
RENEWING HOUSING COVER SEAL, CONTROL
LEVER BUSHING AND O-RING ON CONTROL
LEVER SHAFT

* Housing cover attachment

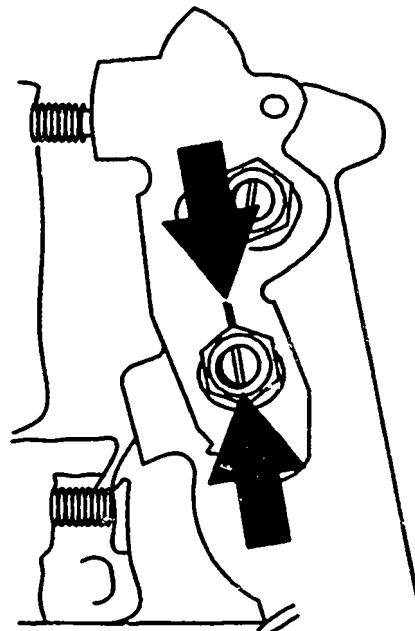
- 1 = Cylindrical helical coiled spring
- 2 = Control lever
- 3 = Hexagon nut

Fit cylindrical helical coiled spring
and control lever. Attach control
lever to setting shaft such that marks
on control lever and setting shaft
coincide (arrows).
Screw on hexagon nut.

Continue: D02/1 Fig.: D01/1



KMK03310



ASSEMBLING AND ATTACHING HOUSING COVER

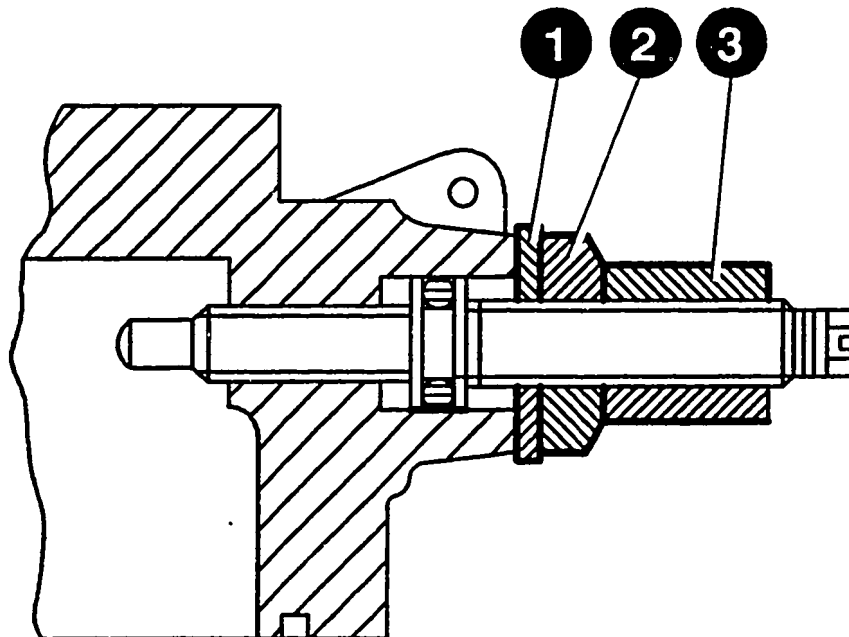
- 1 = Washer
- 2 = Hexagon nut
- 3 = Retaining sleeve

Attach washer, hexagon nut and retaining sleeve to pump housing.

Tighten fastening screws of housing cover.

Continue: D03/1 Fig.: D02/2

KMK03311



CHECKING HOUSING COVER FOR LEAKS

Functional strength of Loctite 582 is attained after approx. 45 minutes at ambient temperature.

Close off overflow on distributor-type fuel-injection pump with screw plug.

Establish compressed-air connection on intake side of distributor-type fuel-injection pump, place pump in calibrating-oil tank and apply 8 bar test pressure. No air bubbles may emerge between bushing and housing cover within test period (pressure retention time) of 20 seconds.

Continue: C01/1

DISASSEMBLING FUEL-INJECTION PUMP

* Removal of coupling half

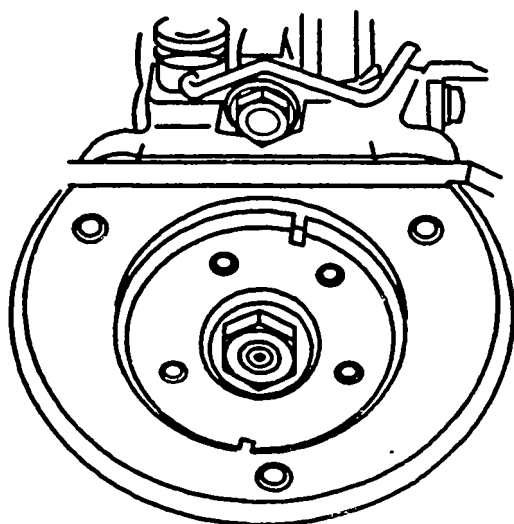
Select removal of drive coupling as per illustration:

* Removing coupling half with
release screws, D05/1
left picture

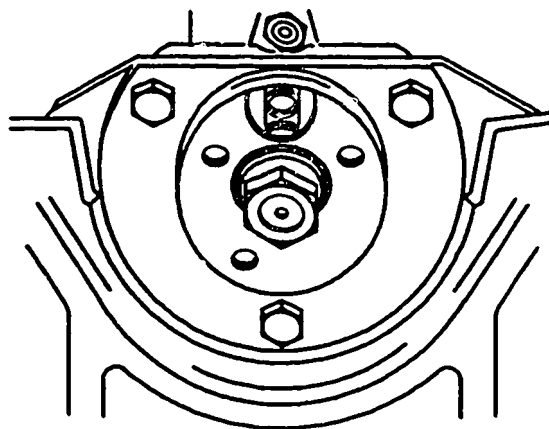
* Removing coupling half with
extractor, D07/1
right picture

* Removing coupling half with
intermediate flange
(not illustrated) D08/1

Continue: D05/1 Fig.: D04/2



KMK03312



REMOVING COUPLING HALF

* With release screws

1 = Coupling half

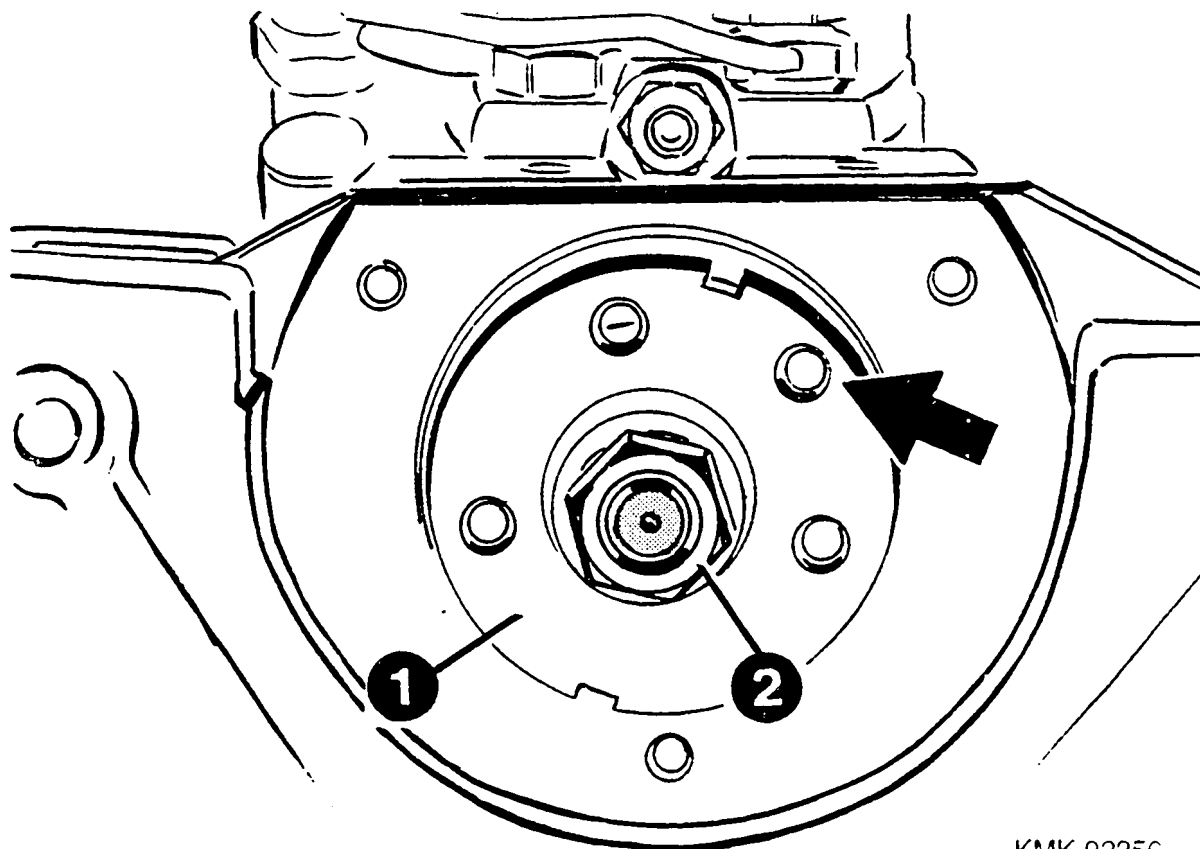
2 = Fastening nut

Counterhold coupling half with hook wrench (commercially available).
Loosen fastening nut.

NOTE:

Do not counterhold coupling half by setting at setting hole (arrow).

Continue: D06/1 Fig.: D05/2



KMK 02256

REMOVING COUPLING HALF

* With release screws

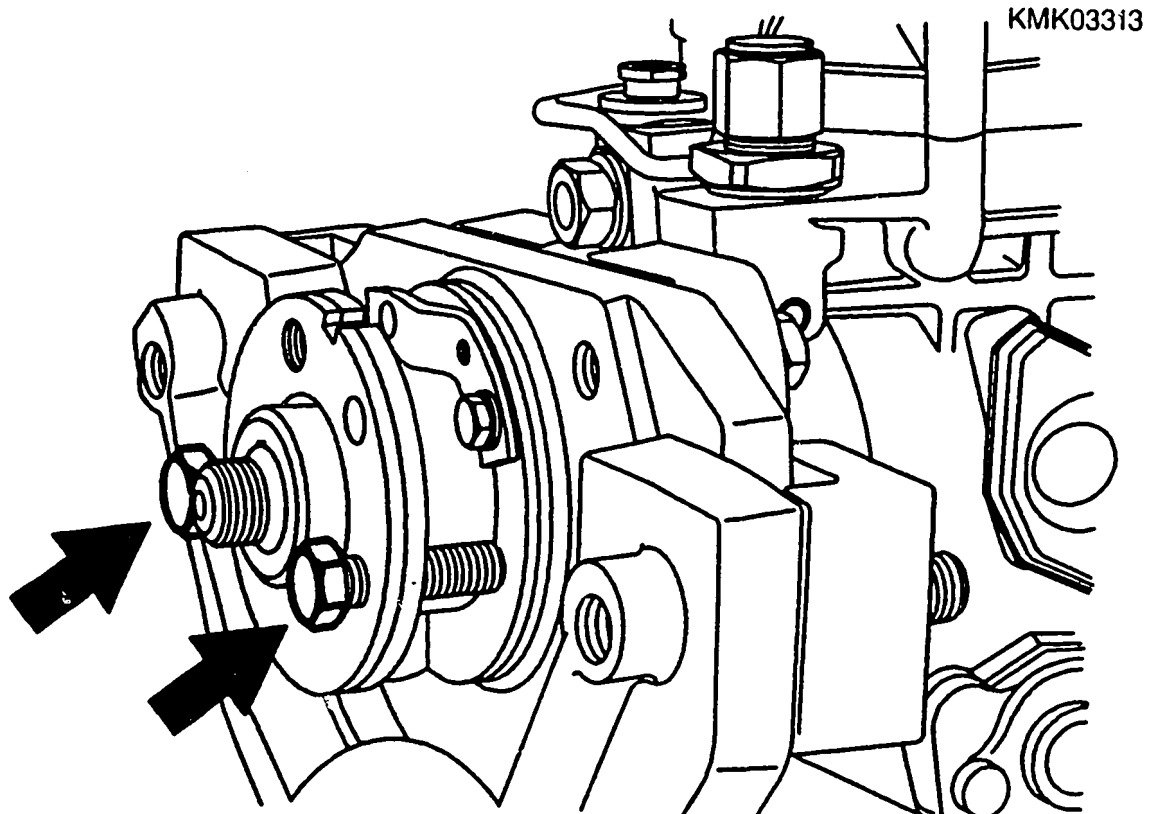
Arrows = Release screws

Screw release screws (M8) into coupling half.

Press coupling half off taper of drive shaft by screwing in the two release screws.

In doing so, pay attention to Woodruff key.

Continue: D09/1 Fig.: D06/2



REMOVING COUPLING HALF

* With extractor

1 = Coupling half

2 = Fastening nut

Loosen fastening nut.

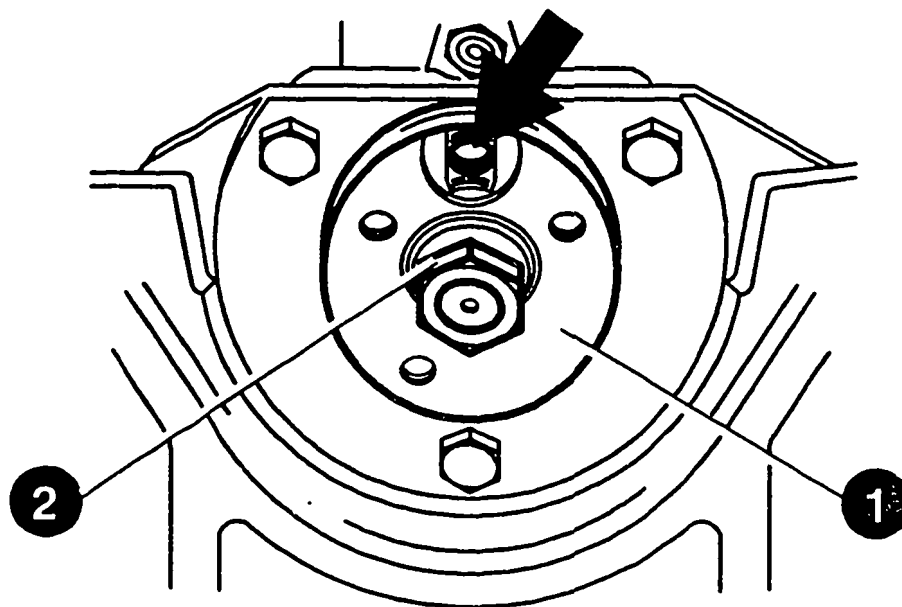
NOTE:

Do not counterhold at setting hole (arrow).

Press off coupling half with commercially available extractor.

Continue: D09/1 Fig.: D07/2

KMK03314



REMOVING COUPLING FLANGE

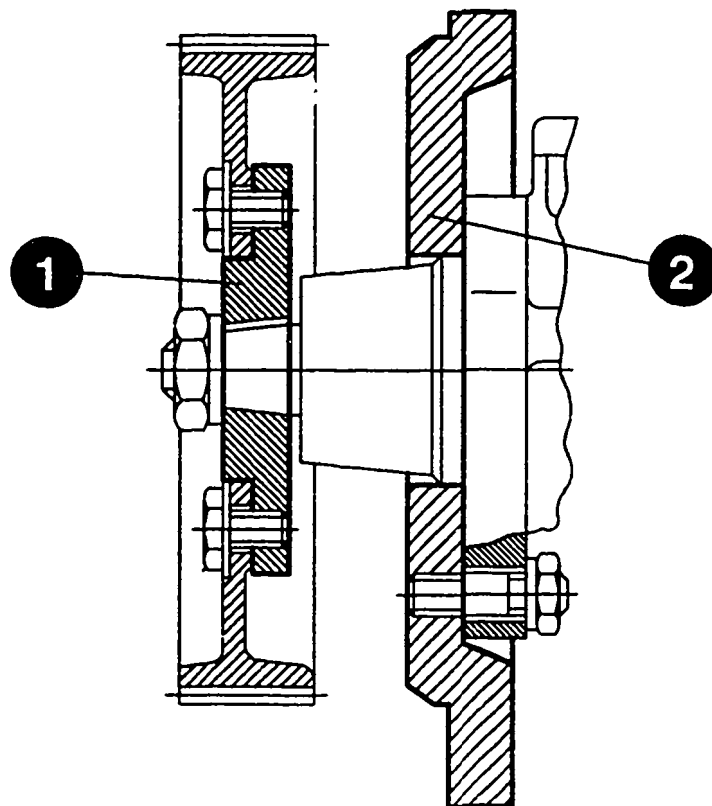
1 = Coupling half

2 = Intermediate flange

Note:

Before disassembling distributor-type fuel-injection pumps VE .. R 11, R 14 and VE 15 installed in Ford York Transit, pull off coupling half (with commercially available extractor) and remove intermediate flange.

Continue: D09/1 Fig.: D08/2



KMK03315

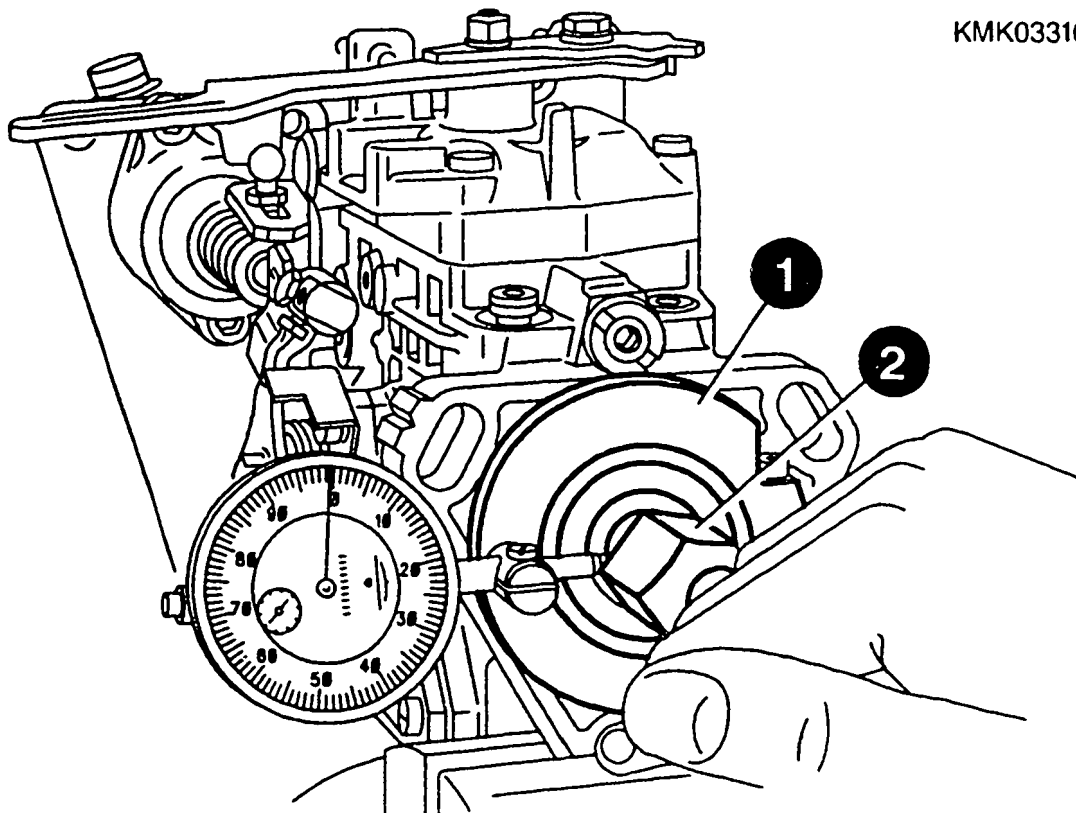
CHECKING TILT CLEARANCE

1 = Dial-indicator holder

2 = Measuring device

Whenever distributor-type fuel-injection pumps with toothed-belt drive are to be disassembled and repaired, the tilt clearance of the drive shaft must first be measured, so as to avoid unnecessary operations. Attach dial-indicator holder KDEP 1128 or KDEP 1146 with dial indicator 1 687 233 011 to centering collar of pump flange. Screw measuring device KDEP 2890 onto drive shaft.

Continue: D10/1 Fig.: D09/2



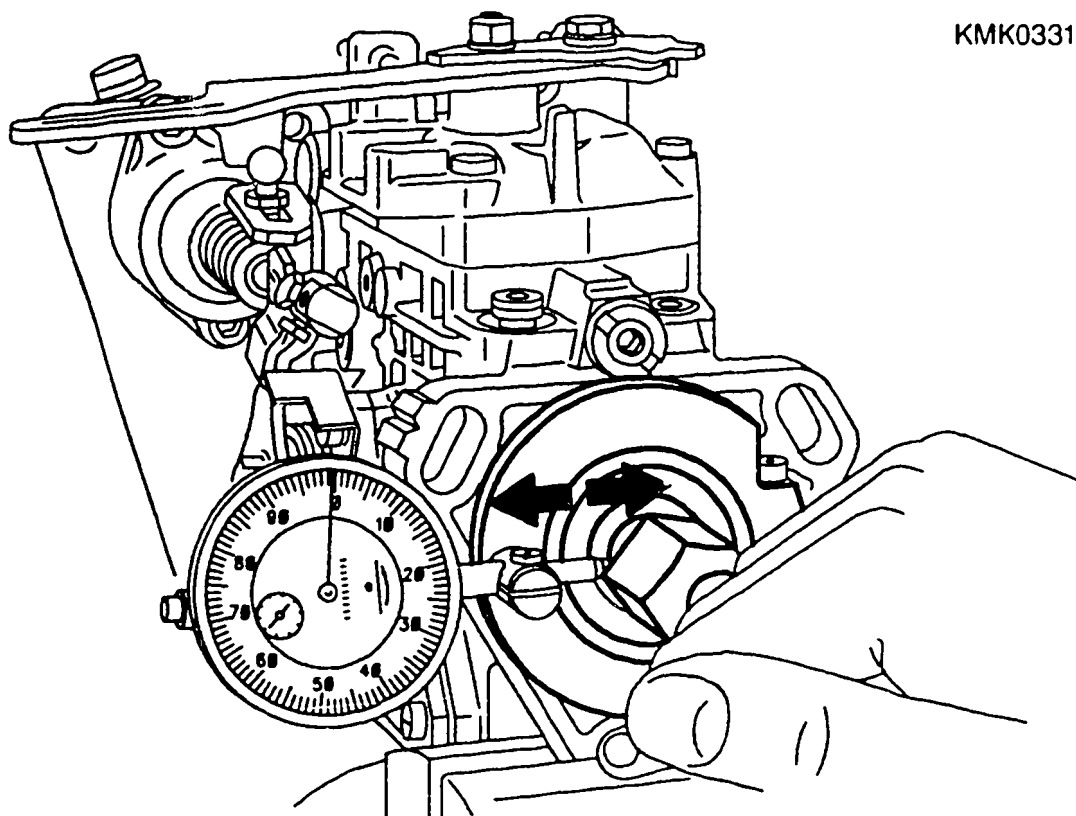
KMK03316

CHECKING TILT CLEARANCE

Initially tension indicator
approx. 2 mm.

Move drive shaft of pump back and
forth by hand at threaded pin in
direction of resultant tensile force
of toothed belt (arrows).

Continue: D11/1 Fig.: D10/2

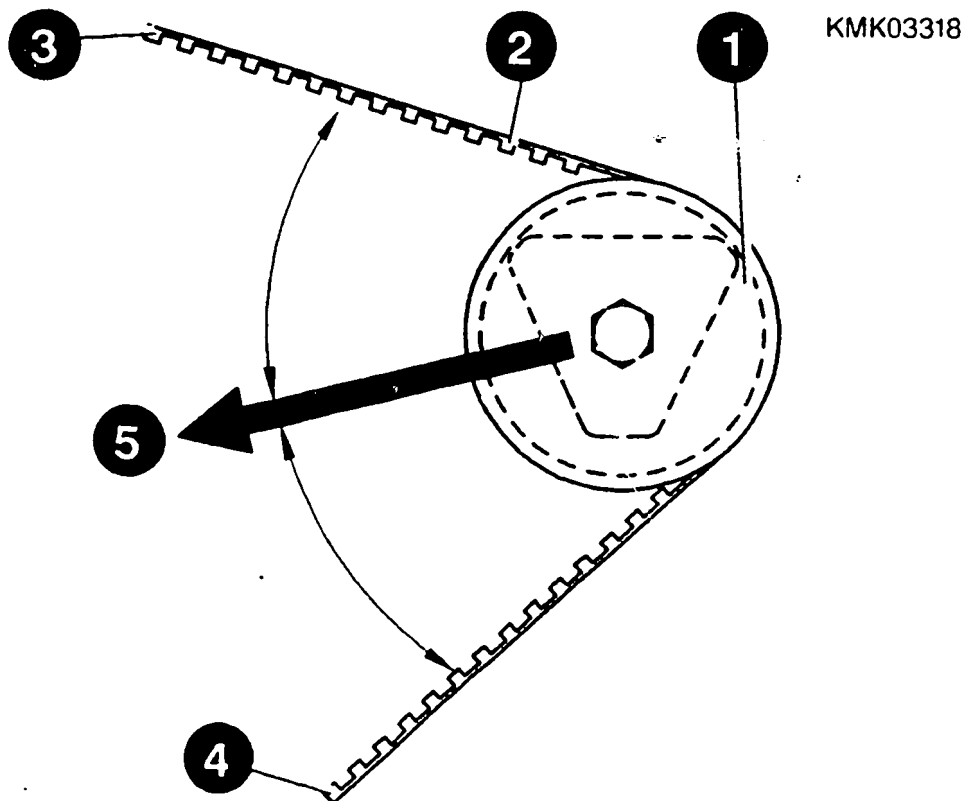


CHECKING TILT CLEARANCE

- 1 = Distributor-type fuel-injection pump driving gear
- 2 = Toothed belt
- 3 = Toothed-belt arm 1
- 4 = Toothed-belt arm 2
- 5 = Direction of resultant toothed-belt force

The direction of the resultant tensile force results from the position of the two toothed-belt arms with respect to the pump driving gear at the motor. This position is to be established prior to pump removal.

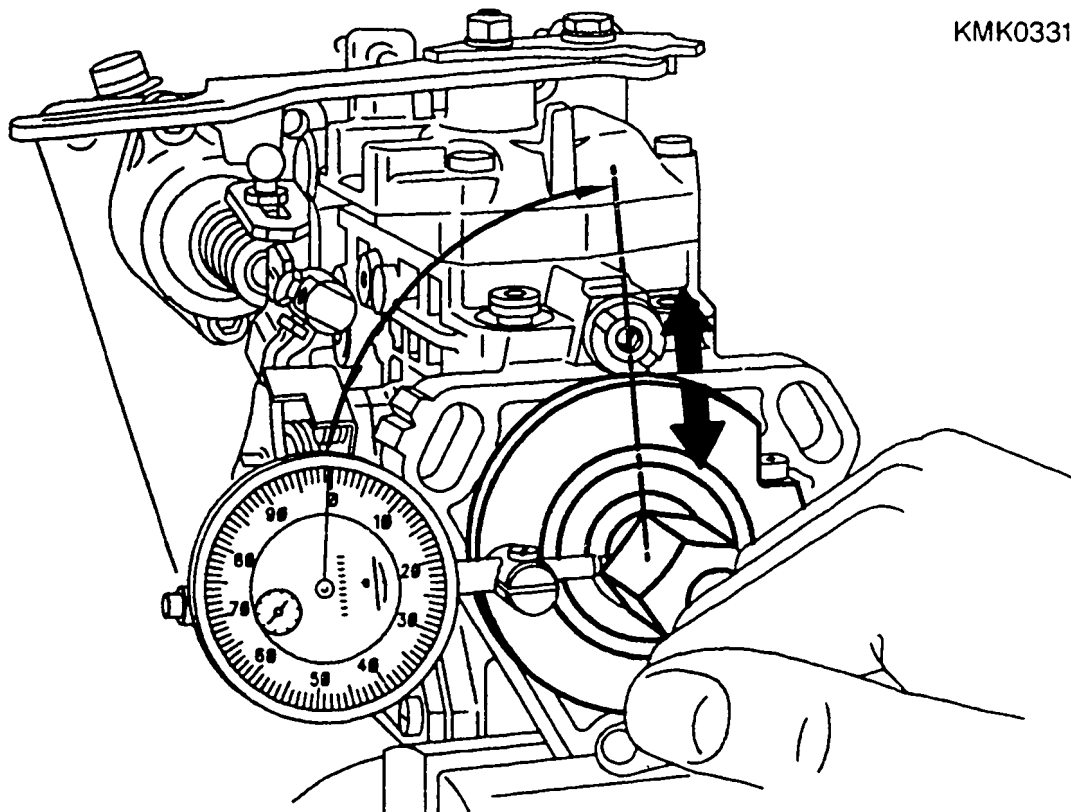
Continue: D12/1 Fig.: D11/2



CHECKING TILT CLEARANCE

Slightly loosen clamping screw at dial-indicator holder following first measurement procedure. Turn dial-indicator holder with dial indicator through 90° to first measurement plane. Tighten clamping screw again. Perform second tilt-clearance measurement in this measurement plane. The tilt clearance must not exceed max. 0.25 mm in both measurement planes.

Continue: D13/1 Fig.: D12/2



KMK03319

CHECKING TILT CLEARANCE

In the case of direct-drive distributor-type fuel-injection pumps (not by way of toothed belt), both measurement planes are positioned horizontally and perpendicularly with respect to the pump housing. Here again the maximum tilt-clearance tolerance is 0.25 mm.

If the stated tolerance or the tilt clearance is exceeded, use is to be made of a new housing (and if applicable also a new drive shaft).

Continue: D14/1

REMOVING HOUSING COVER

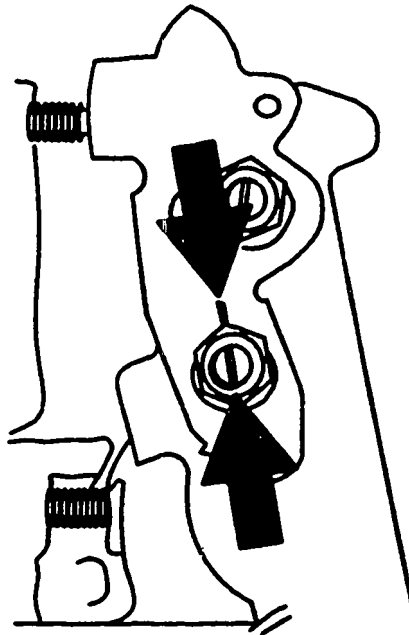
Remove overflow restriction and empty distributor-type fuel-injection pump. Attach distributor-type fuel-injection pump with flange and support clamp

KDEP 2963 to clamping support

KDEP 2919.

Mark control lever and setting shaft with respect to one another (arrows).

Continue: D15/1 Fig.: D14/2



KMK02289

REMOVING HOUSING COVER

- 1 = Cylindrical helical coiled spring
- 2 = Control lever
- 3 = Hexagon nut with spring lock washer

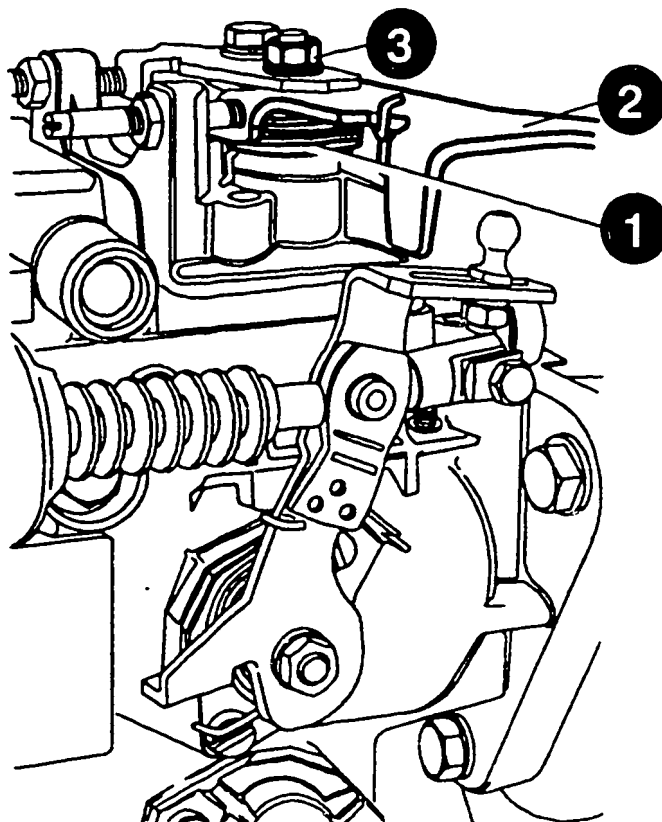
Disengage cylindrical helical coiled spring.

Remove hexagon nut with spring lock washer.

Pull off control lever.

Remove fastening screws of housing cover.

Continue: D16/1 Fig.: D15/2



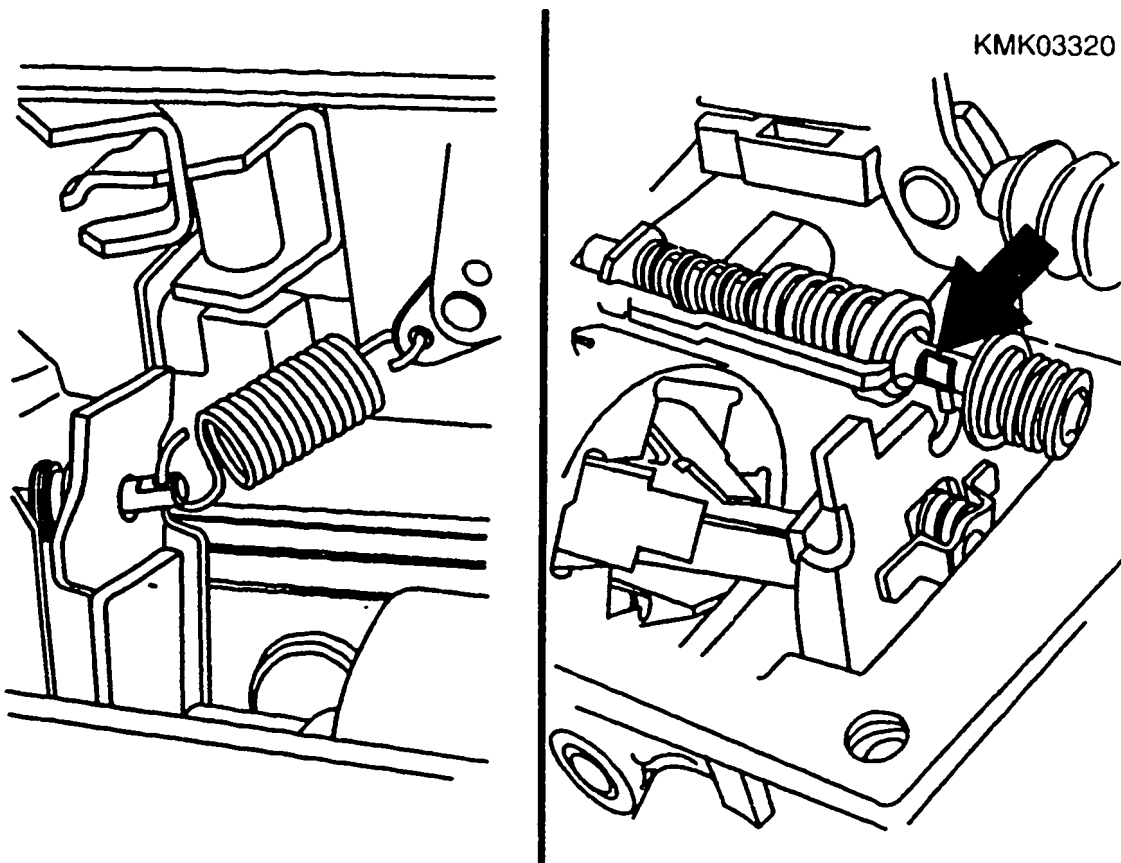
KMK03294

REMOVING HOUSING COVER

Select further procedure in line with following features:

- * Pump with variable-speed governor, left picture D17/1
- * Pump with part-load governor, right picture D19/1
- * Pump with housing-fixed idle spring (LFG) (not illustrated) D23/1

Continue: D17/1 Fig.: D16/2



REMOVING HOUSING COVER

* Variable-speed governor removal

1 = Extension spring

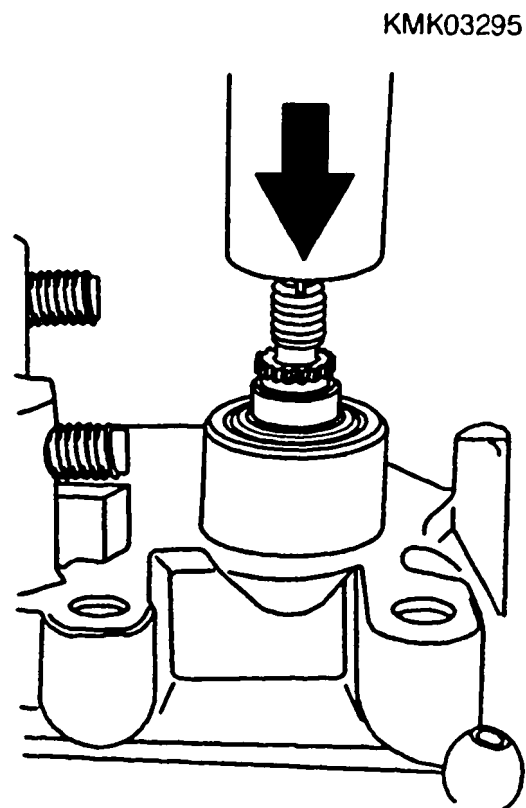
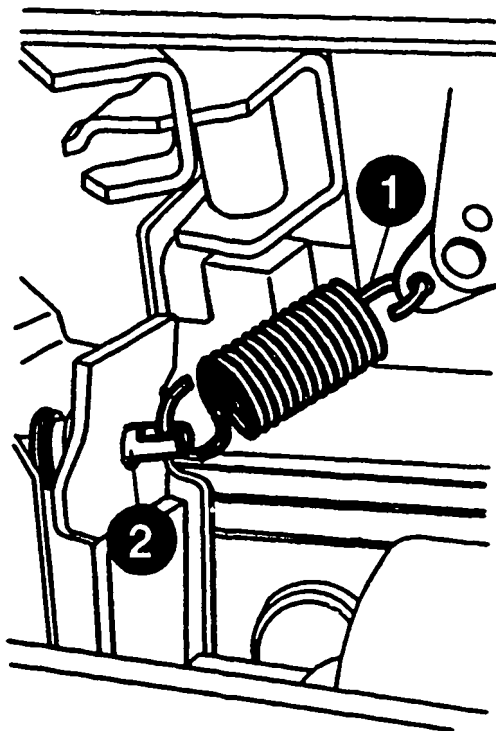
2 = Retaining pin with compression spring

Raise housing cover and disengage extension spring from retaining pin.

Set down retaining pin with compression springs. Disengage extension spring from setting shaft.

Press through setting shaft in direction of inside of cover.

Continue: D18/1 Fig.: D17/2



REMOVING HOUSING COVER

* Variable-speed governor removal

1 = Setting shaft

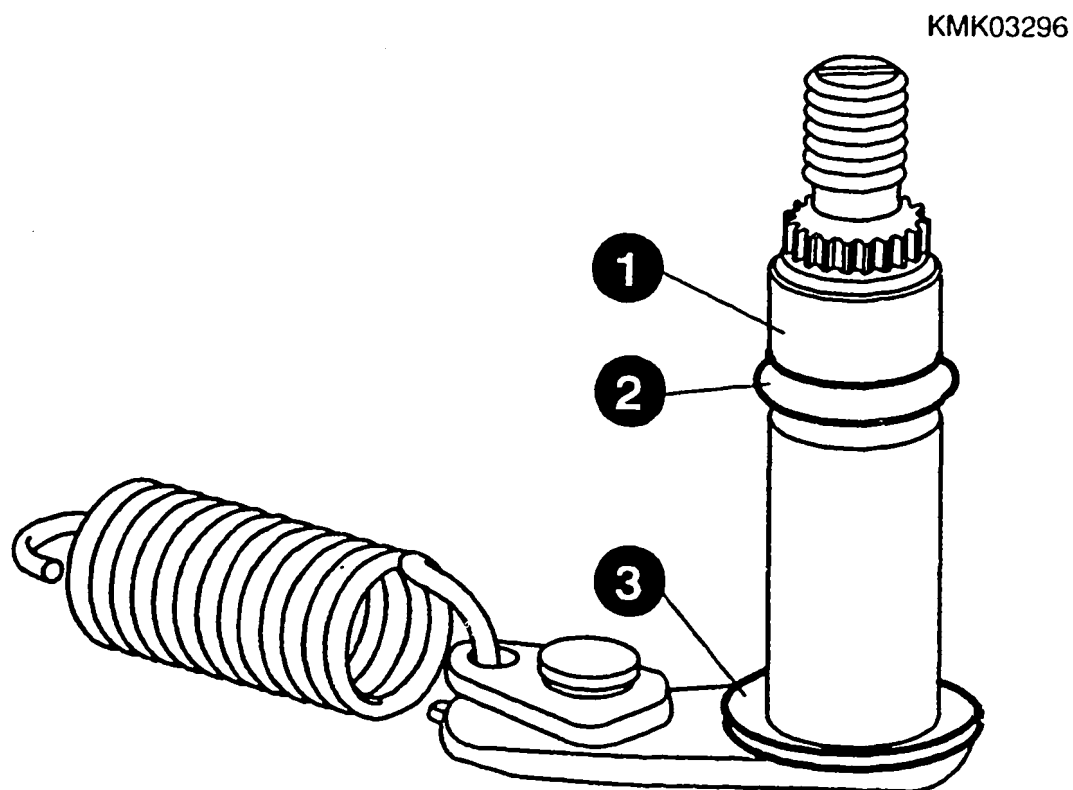
2 = O-ring

3 = Washer

Remove O-ring and shim from setting shaft.

Remove housing cover. Take seal ring out of housing cover.

Continue: D24/1 Fig.: D18/2



REMOVING HOUSING COVER

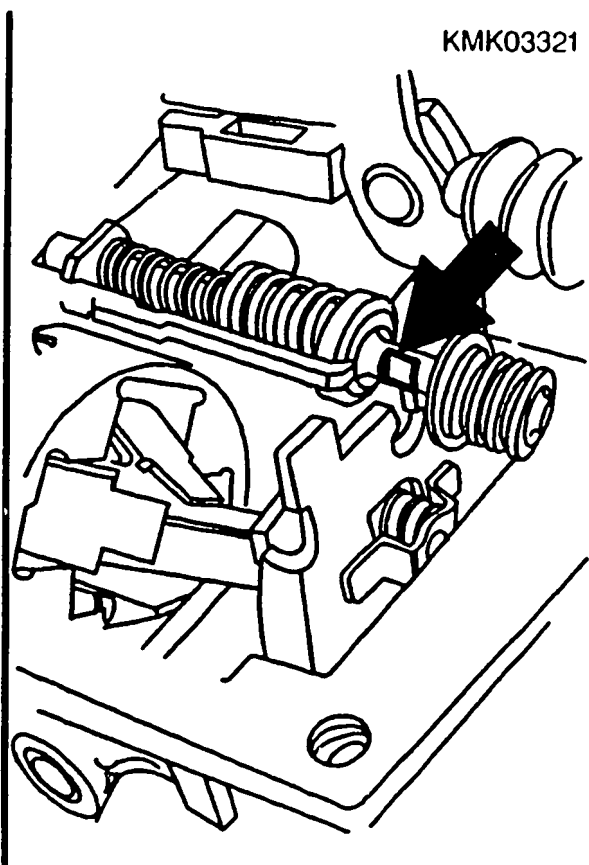
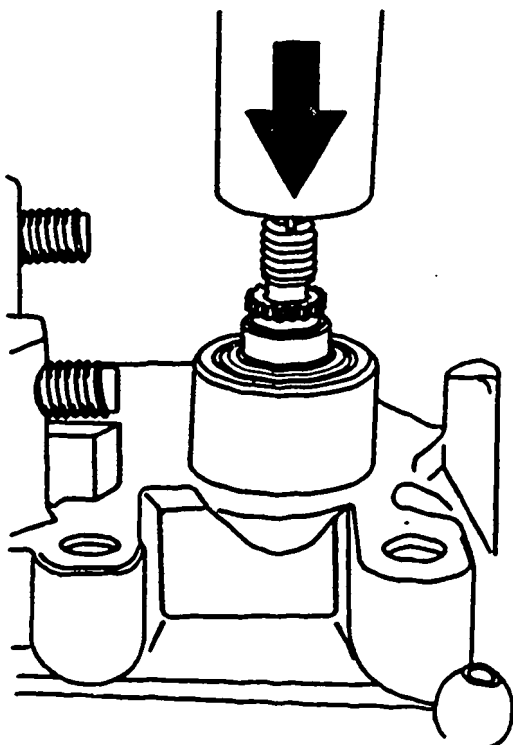
- * Remove part-load governor with detachment surfaces
- * Without detachment surfaces, Coordinate D21/1

Press through setting shaft in direction of inside of cover.

Raise housing cover.

Push part-load governor in direction of fulcrum lever and disengage from fulcrum lever at milled surfaces (arrow). Remove entire part-load governor. Remove O-ring and shim from setting shaft.

Continue: D20/1 Fig.: D19/2



REMOVING HOUSING COVER

- * Remove part-load governor with detachment surfaces

1 = Part-load governor, complete

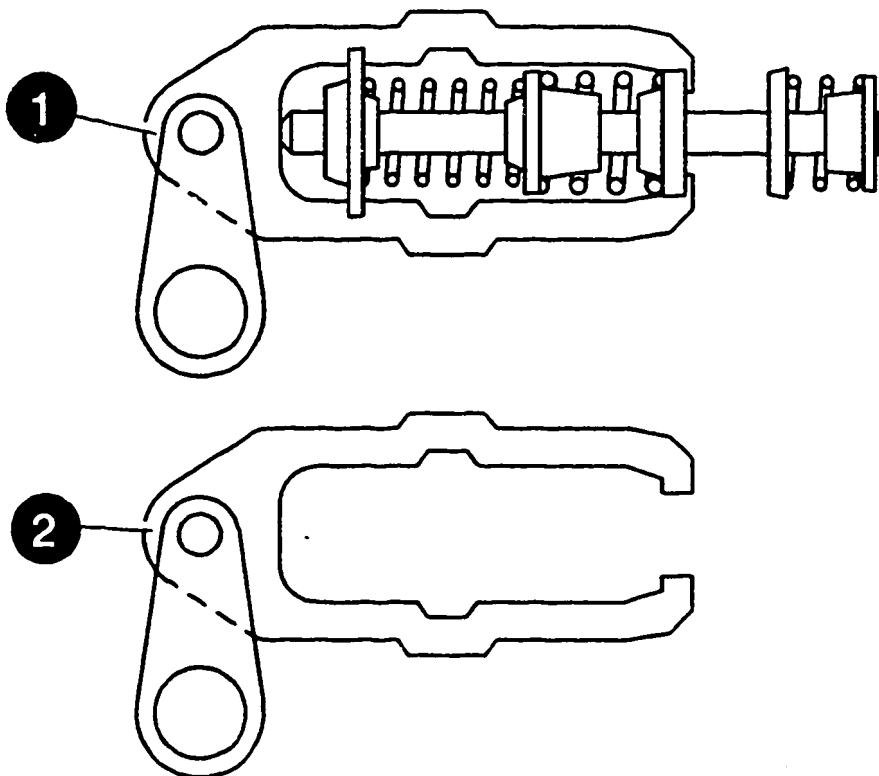
2 = Setting shaft with clamp

Note:

The part-load governor can either be ordered complete or without spring pack if only the setting shaft is worn.

Continue: D24/1 Fig.: D20/2

KMK03322



REMOVING HOUSING COVER

- * Removing part-load governor with no detachment surfaces

- 1 = Retaining ring
- 2 = Retaining pin
- 3 = Intermediate spring

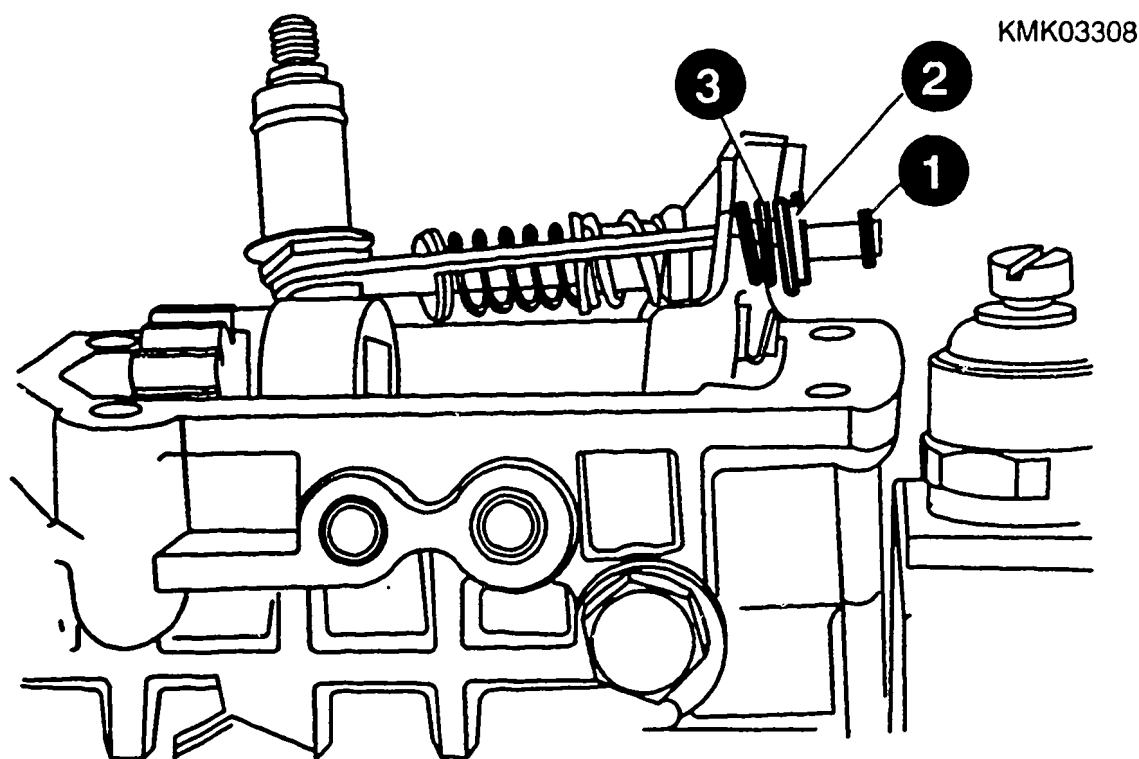
Press through setting shaft in direction of inside of cover.

Lift housing cover.

Remove retaining ring from guide pin of part-load governor.

Remove retaining pin and intermediate spring.

Continue: D22/1 Fig.: D21/2



REMOVING HOUSING COVER

- * Removing part-load governor with no detachment surfaces

1 = Setting shaft

2 = O-ring

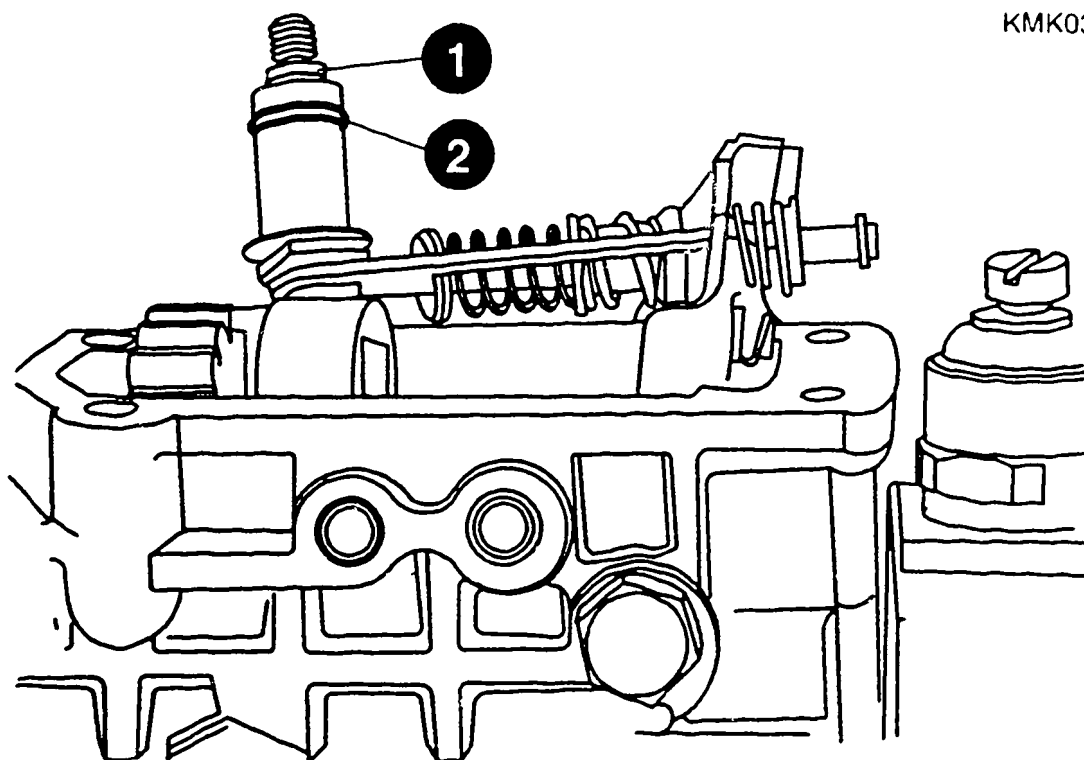
Remove part-load governor complete with setting shaft, main governor spring and part-load spring from fulcrum lever assembly.

Remove O-ring and shim from setting shaft.

Note:

Shim is on hook of part-load governor.

Continue: D24/1 Fig.: D22/2



KMK03323

REMOVING HOUSING COVER

* Pump with housing-fixed idle spring
(LFG)

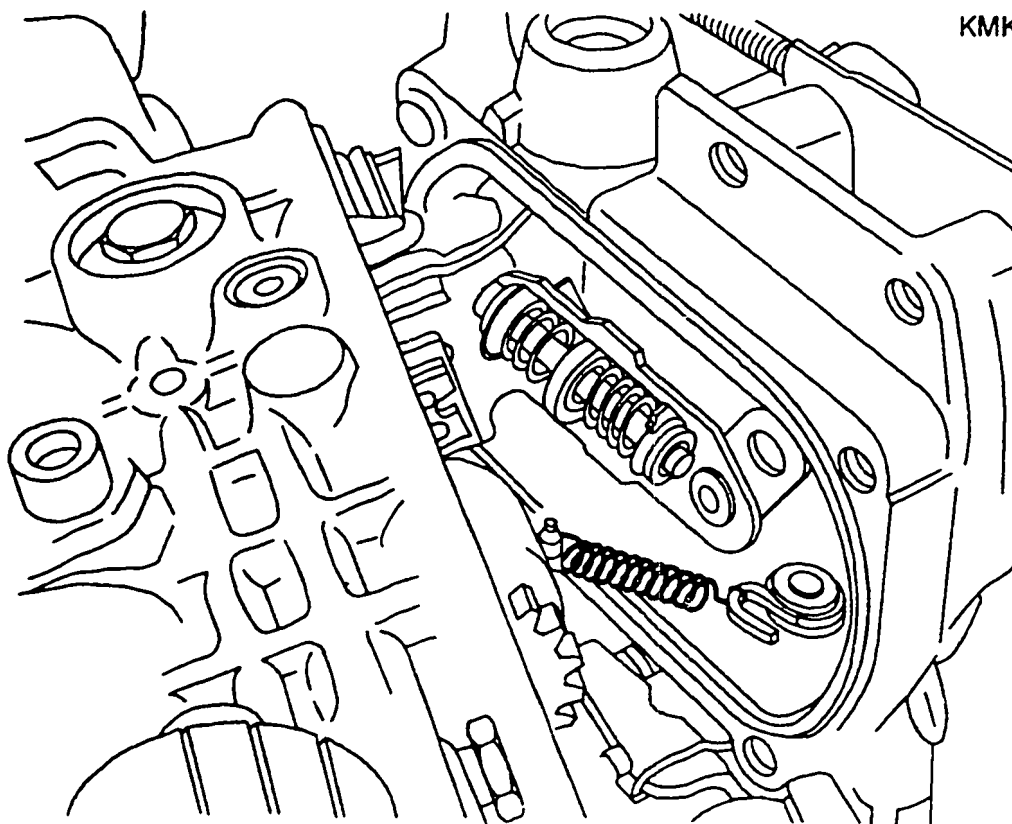
1 = Extension spring (idle spring)

2 = Part-load governor

Fold housing cover somewhat to one side and disengage extension spring (idle spring). Do NOT overextend spring.

Press through setting shaft in direction of inside of cover.

Continue: D24/1 Fig.: D23/2



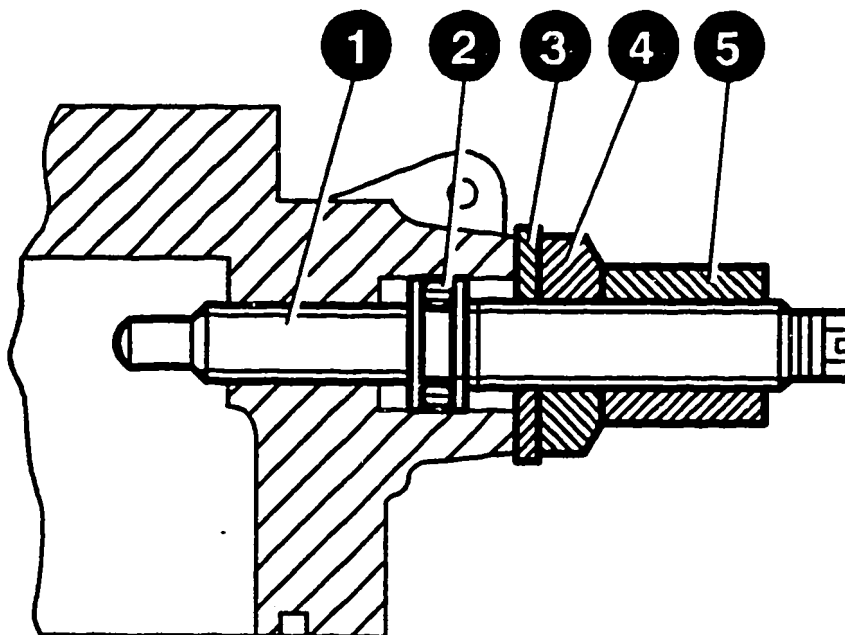
REMOVING THREADED PIN (FULL-LOAD ADJUSTING SCREW)

- 1 = Threaded pin (full-load
adjusting screw)
- 2 = O-ring
- 3 = Washer
- 4 = Hexagon nut
- 5 = Retaining sleeve

Remove seal ring from housing cover.
Remove threaded pin with hexagon nut,
washer, O-ring and retaining sleeve.

Continue: D25/1 Fig.: D24/2

KMK03298



REMOVING SHUTOFF DEVICE

- 1 = Cylindrical helical coiled spring
- 2 = Lever shaft
- 3 = Hexagon nut
- 4 = Stop lever

* Pump with no shutoff device:

Continue on Coordinate D27/1

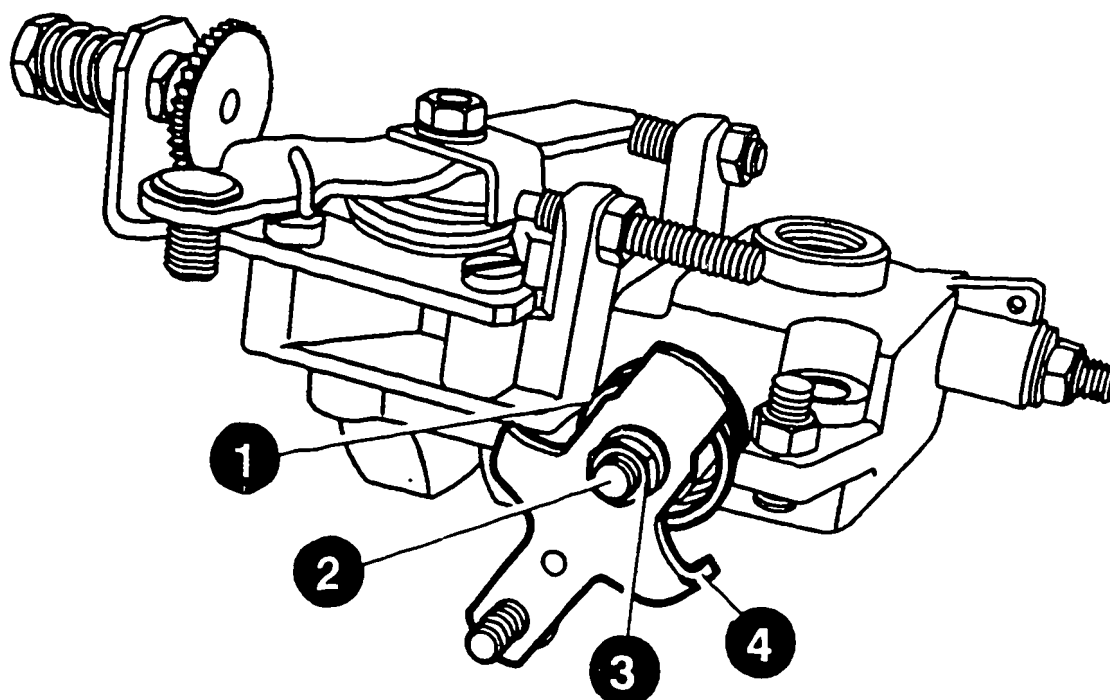
Disassembling mechanical shutoff device:

Disengage cylindrical helical coiled spring.

Mark position of outer stop lever/excess fuel quantity restrictor with respect to lever shaft. Remove hexagon nut and spring lock washer. Pull outer stop lever off lever shaft.

Continue: D26/1 Fig.: D25/2

KMK03325



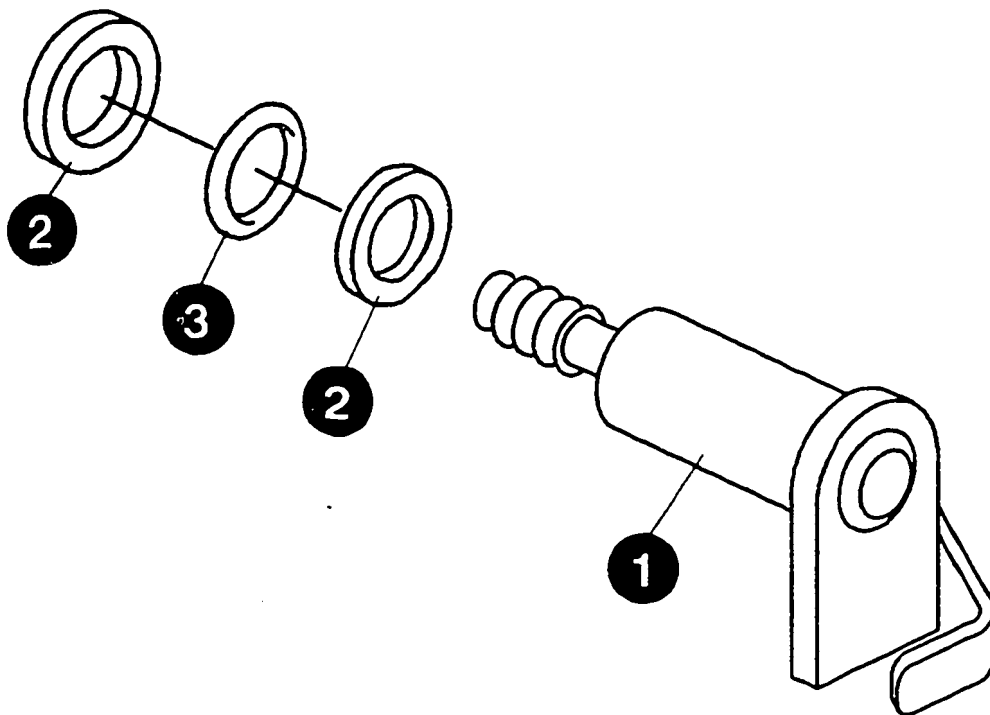
REMOVING SHUTOFF DEVICE

- 1 = Lever shaft
- 2 = Shims
- 3 = O-ring

Pull lever shaft out of housing cover.
Remove shims and O-ring.

Continue: D27/1 Fig.: D26/2

KMK03300



REMOVING TEMPERATURE-DEPENDENT EXCESS FUEL QUANTITY RESTRICTOR (TAS)

- 1 = Lever shaft
- 2 = Cylindrical helical coiled spring
- 3 = Regulating lever
- 4 = Hexagon nut

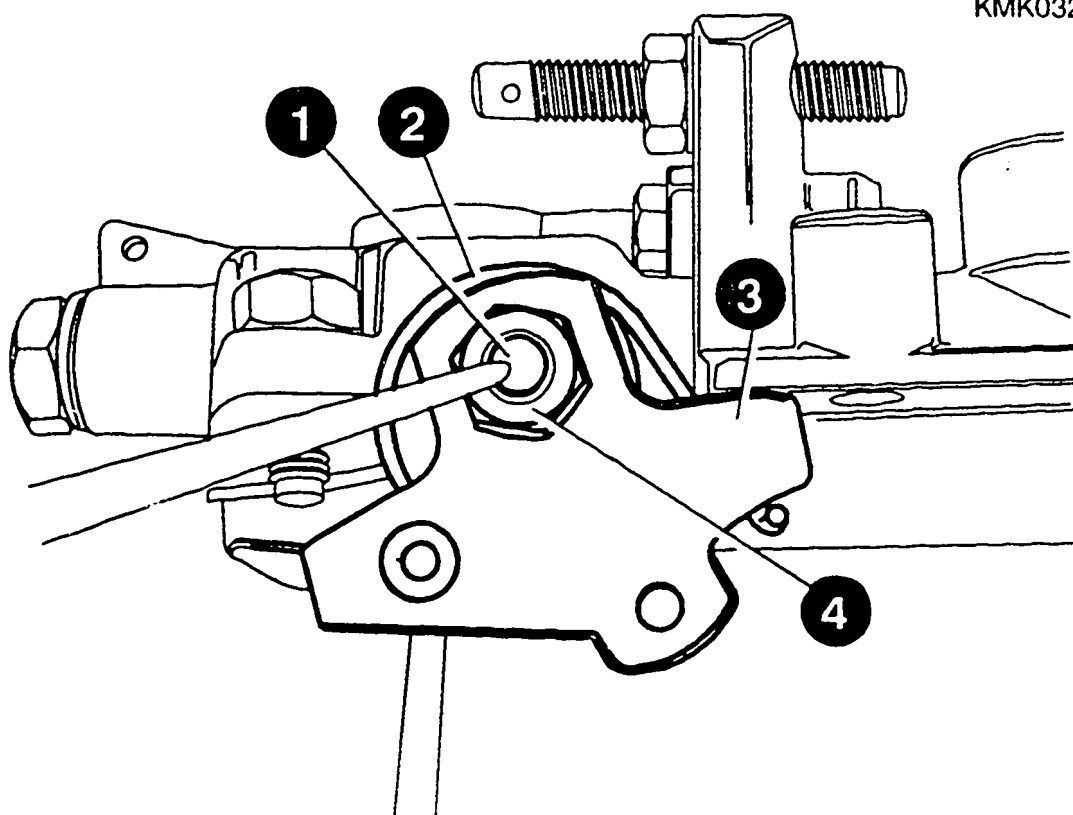
Disengage cylindrical helical coiled
spring.

Mark position of regulating
lever/stop lever in the case of
mechanical stop with respect to lever
shaft (see picture).

Remove hexagon nut with spring lock
washer.

Pull regulating lever off lever shaft.

Continue: D26/1 Fig.: D27/2



KMK03299

REMOVING SETTING SHAFT, HOUSING-FIXED IDLE SPRING (LFG)

- 1 = Stop lever
- 2 = Cylindrical helical coiled spring
- 3 = Hexagon nut
- 4 = Lever shaft

Disengage cylindrical helical coiled spring.

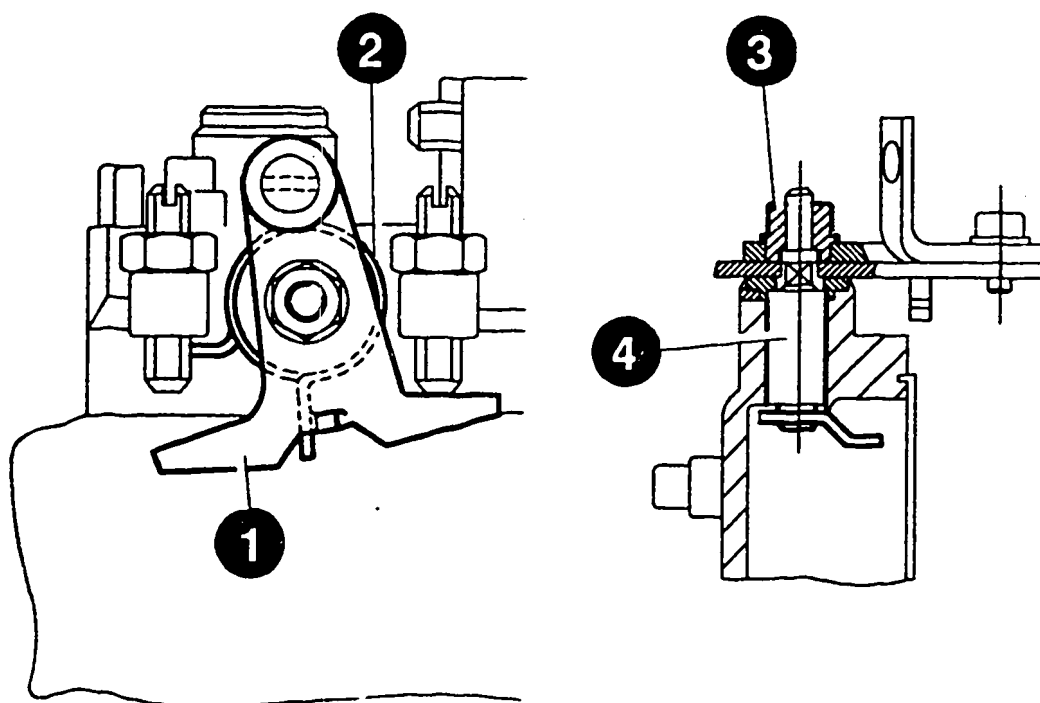
Mark position of stop lever with respect to lever shaft.

Remove hexagon nut and stop lever from lever shaft.

Remove setting shaft.

Continue: E01/1 Fig.: D28/2

KMK03326

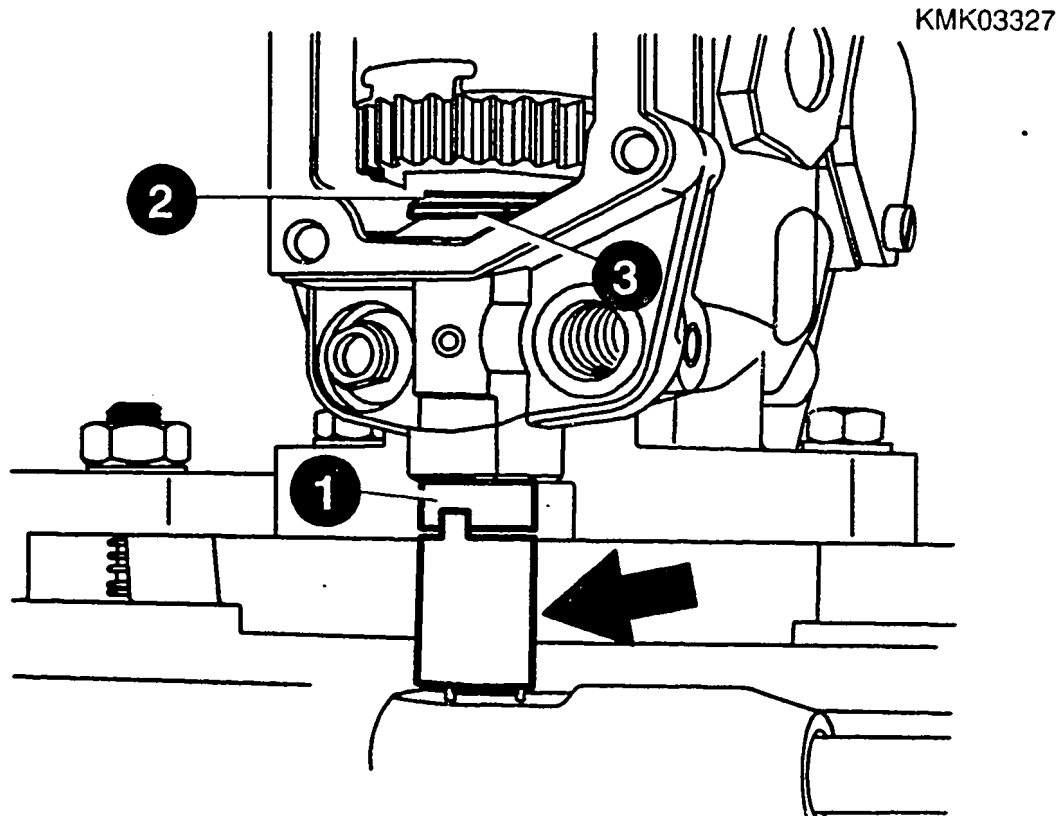


REMOVING GOVERNOR SHAFT

- 1 = Slotted nut
- 2 = Supporting plate
- 3 = Shim plate

Position distributor-type fuel-injection pump perpendicularly. Loosen slotted nut with adjustment tool KDEP 1082 (arrow). Governor shaft and slotted nut have left-hand thread in the case of slotted nuts with identification groove around circumference. Pay attention to supporting plate and trimming plate.

Continue: E02/1 Fig.: E01/2



REMOVING GOVERNOR SHAFT

Note:

In the case of all clockwise-rotation injection pumps with 50 mm pilot, changes were made to the thread of the governor stem and pump housing (conterclockwise to clockwise) as of FD (date of manufacture) 151. The slotted nut used is replaced by a hexagon nut and washer.

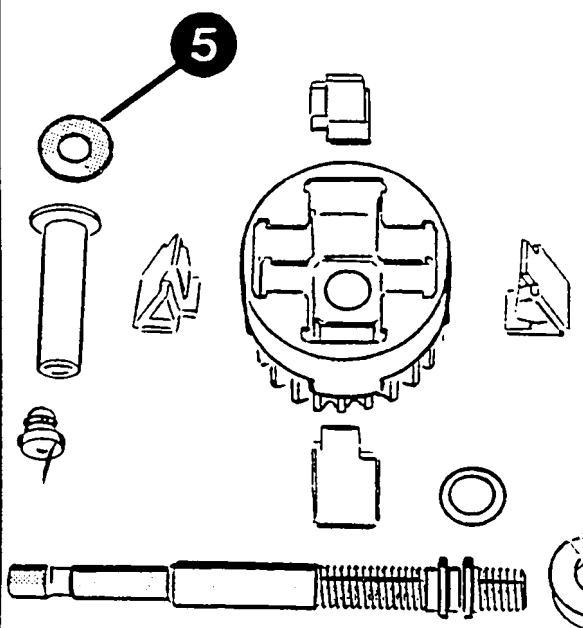
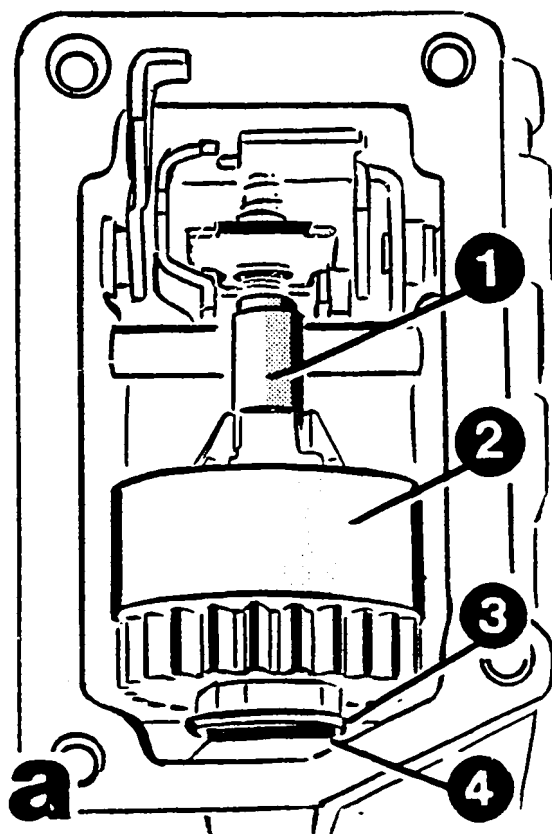
Continue: E03/1

REMOVING GOVERNOR ASSEMBLY

- 1 = Sliding sleeve
- 2 = Governor assembly
- 3 = Supporting plate
- 4 = Shim
- 5 = Spacer

Lift out governor assembly with flyweights and sliding sleeve.
Remove supporting plate and shim.
When disassembling governor assembly, pay particular attention to spacer beneath sliding sleeve (do not lose).

Continue: E04/1 Fig.: E03/2



KMK 02350

REMOVING PRESSURE REGULATOR

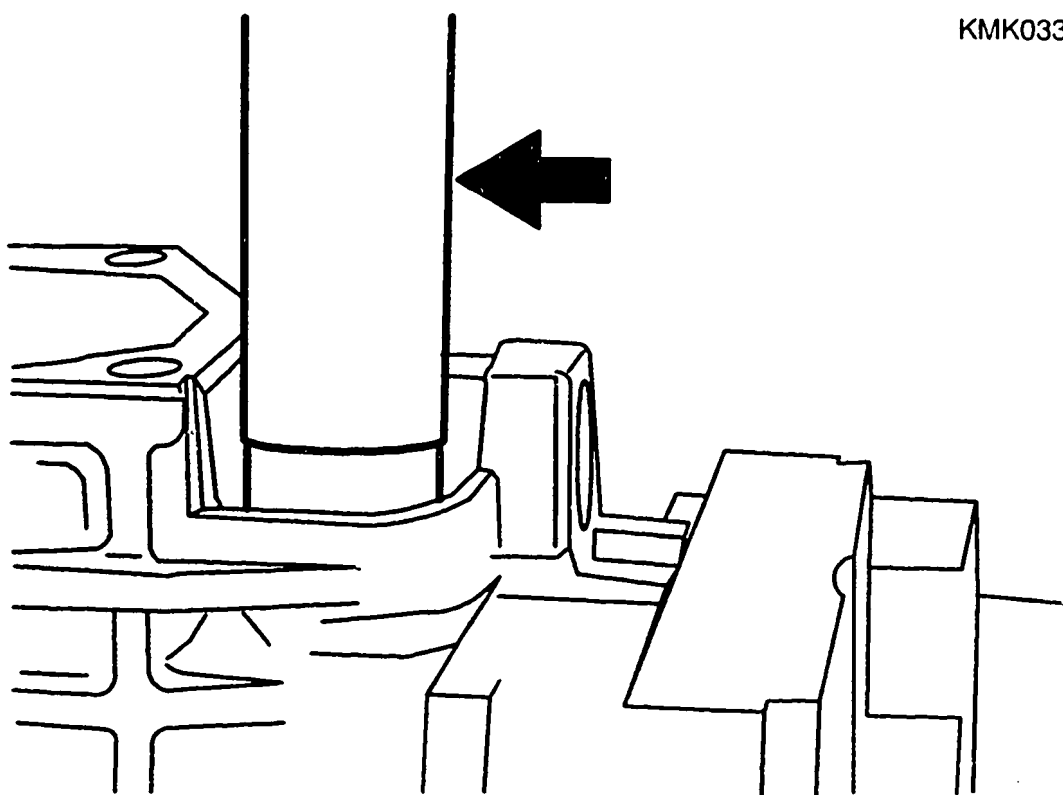
Screw pressure regulator with socket wrench KDEP 1086 (arrow) out of distributor pump housing and remove O-rings.

Note:

In the case of hydraulic cold-start acceleration device, remove ring main to pressure regulator beforehand.

Continue: E05/1 Fig.: E04/2

KMK03328

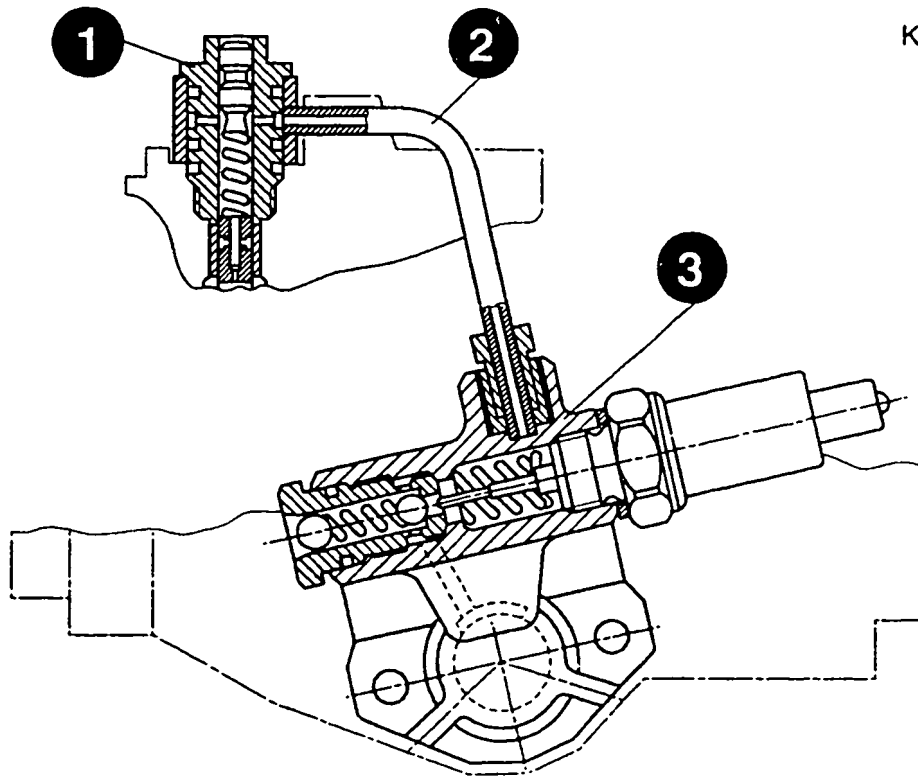


REMOVING HYDRAULIC COLD-START ACCELERATION DEVICE (KSB)

- 1 = Pressure regulator
- 2 = Ring main
- 3 = KSB control valve

Disassemble ring main from pressure
regulator and KSB control valve.
Unscrew KSB control valve.

Continue: E06/1 Fig.: E05/2



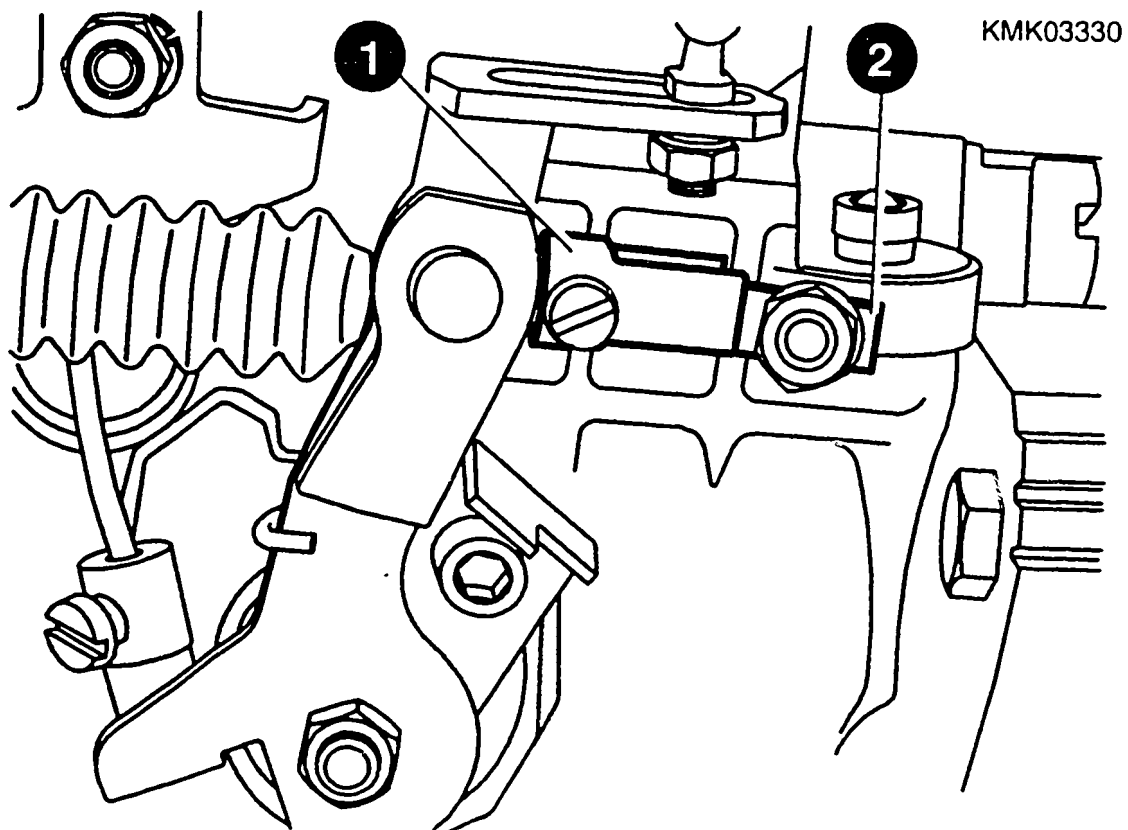
KMK03329

DETACHING CABLE OF TEMPERATURE- CONTROLLED KSB

- 1 = Intermediate piece
- 2 = Clamping piece

If applicable, remove intermediate
piece and clamping piece at cable
between control device and control
lever.

Continue: E07/1 Fig.: E06/2



REMOVING SUPPORT PLATE

1 = Fillister-head screws

2 = Hexagon-socket-head cap screws

3 = Support plate

Remove hexagon-socket-head cap screws (three).

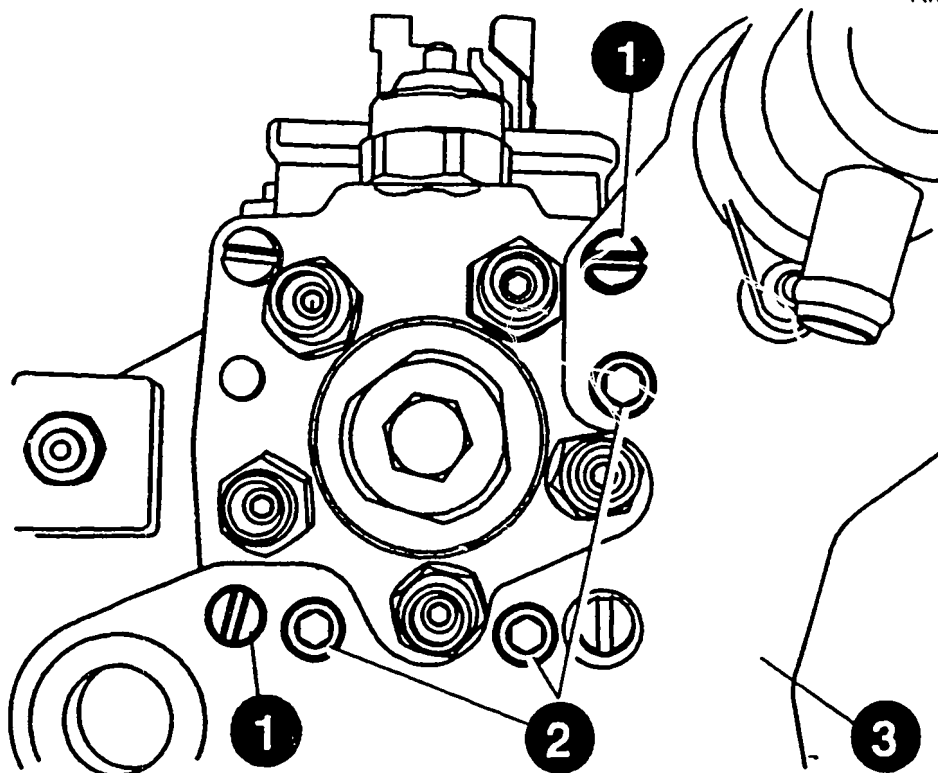
Screw out fillister-head screws (two) and remove support plate.

Note:

Loosen and remove T 30 female Torx bolts with commercially available screwdriver insert.

Continue: E08/1 Fig.: E07/2

KMK03331



REMOVING CENTRAL SCREW PLUG AND DELIVERY-VALVE HOLDER

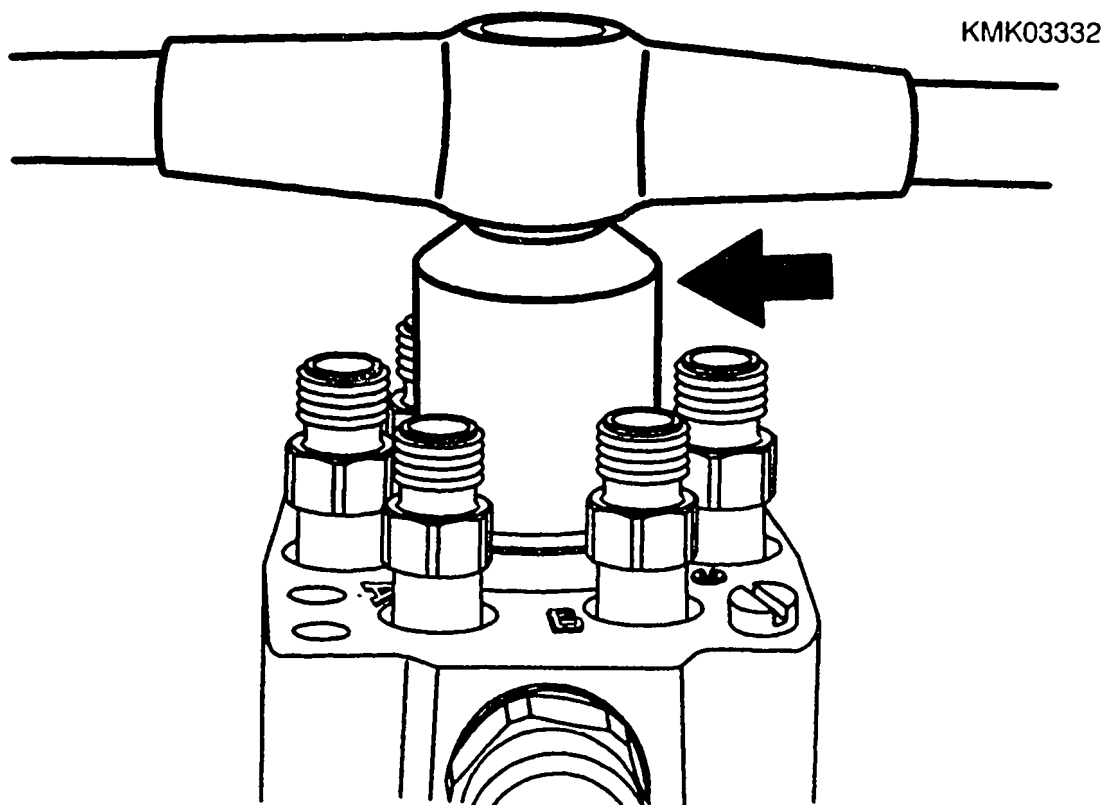
Screw out screw plug with wrench KDEP 1080 (arrow).

Remove seal ring. Remove delivery-valve holder, compression springs, shims and delivery valves. Remove seal rings with extractor hook KDEP 2938.

Note: The outlets on the distributor head are marked A, B, C etc. (see picture).

Set down delivery-valve holders, compression springs etc. in accordance with the above to ensure that they are re-installed at the same location.

Continue: E09/1 Fig.: E08/2



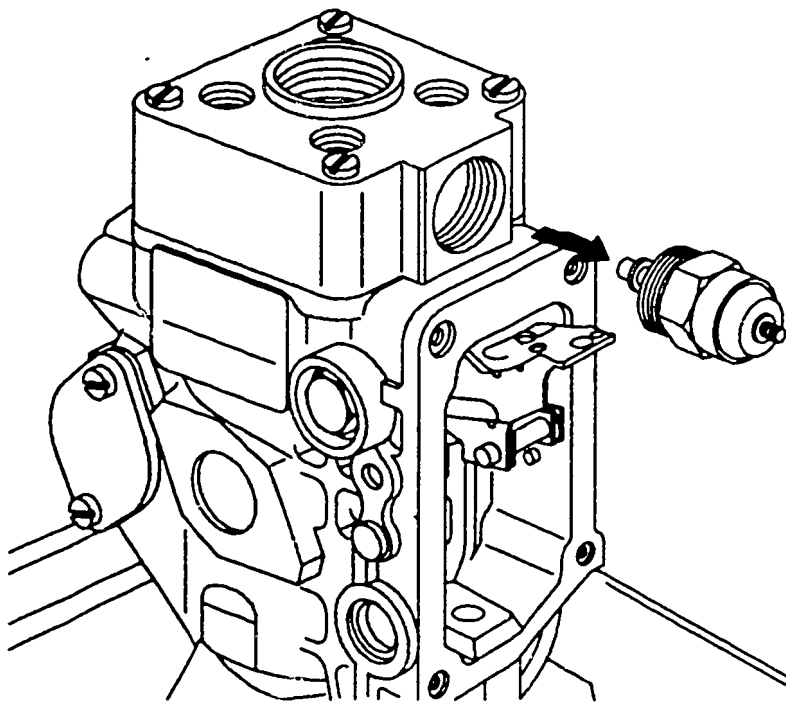
REMOVING SHUTOFF SOLENOID

- 1 = Armature
- 2 = Spring
- 3 = O-ring

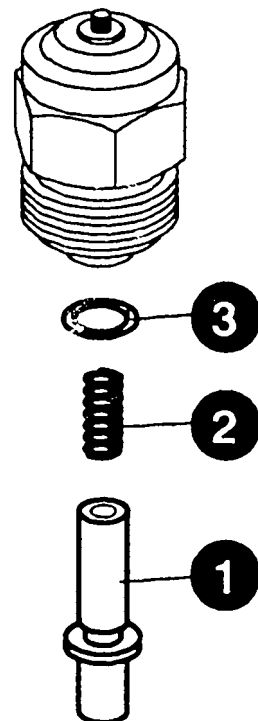
Loosen and remove shutoff solenoid with box wrench KDEP 1174.

Pay attention to spring and armature.

Continue: E10/1 Fig.: E09/2



KMK03333

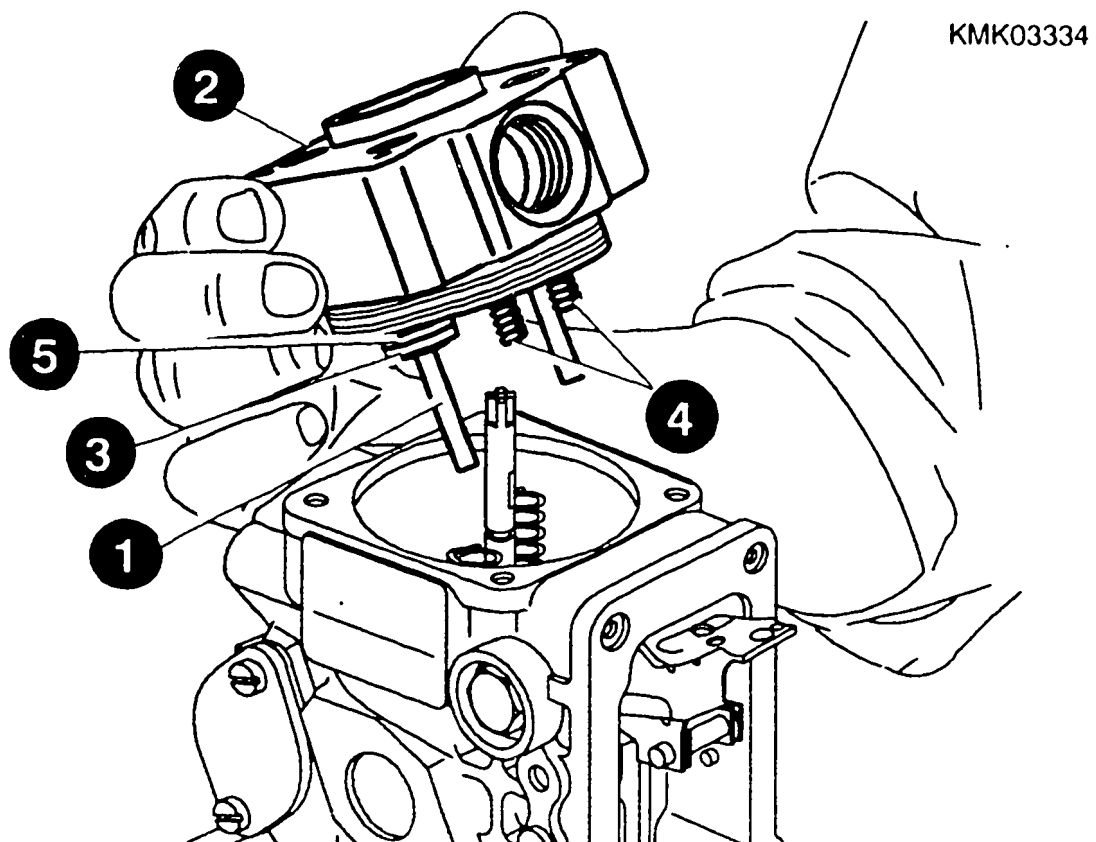


REMOVING DISTRIBUTOR HEAD

- 1 = Guide pins
- 2 = Distributor head
- 3 = Spring seat
- 4 = Compression springs
- 5 = Spacer

Uniformly unscrew fastening screws.
Carefully lift off distributor head
paying attention to guide pins,
spacers and spring seat! Hold
compression springs if necessary.

Continue: E11/1 Fig.: E10/2



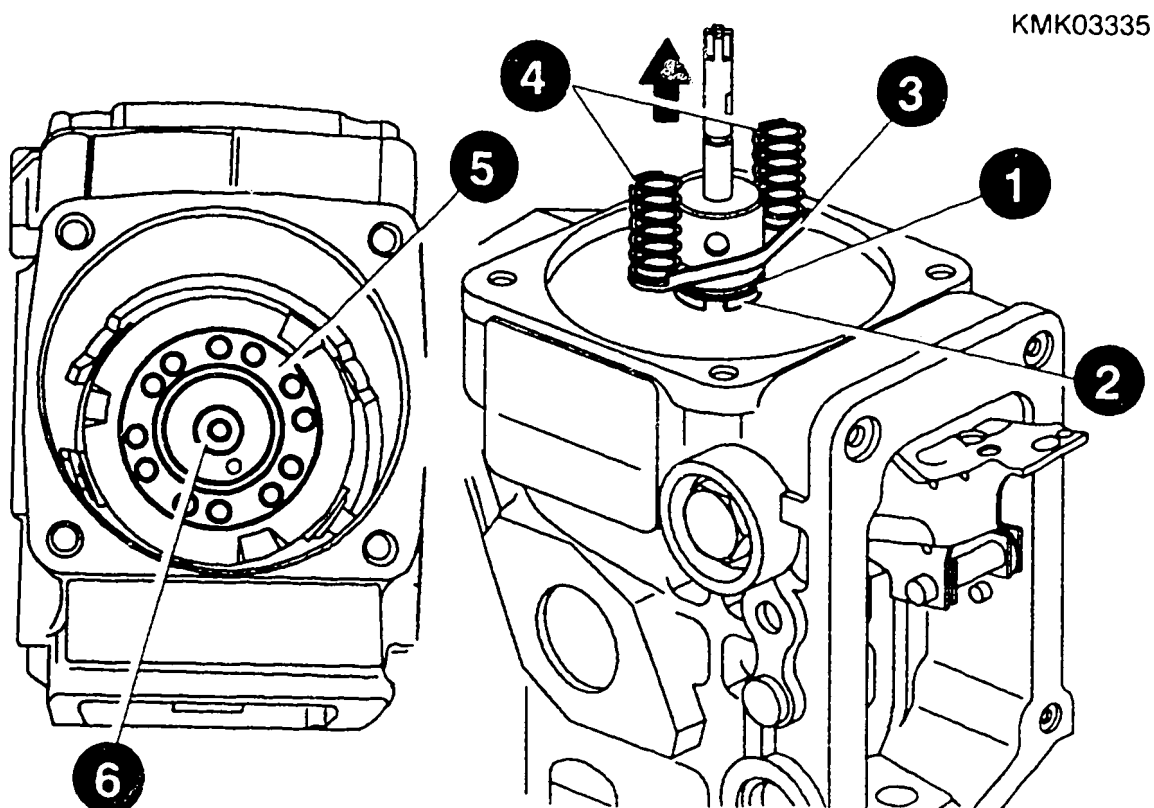
REMOVING DISTRIBUTOR HEAD

- 1 = Shim (large)
- 2 = Slotted washer
- 3 = Spring seat
- 4 = Compression springs
- 5 = Cam plate
- 6 = Shim (small)

Lift out distributor-pump plunger with control spool, shim (large), slotted washer, spring seat and compression springs (picture, left).

Remove cam plate with shim (small) beneath bottom of plunger (picture, right).

Continue: E12/1 Fig.: E11/2

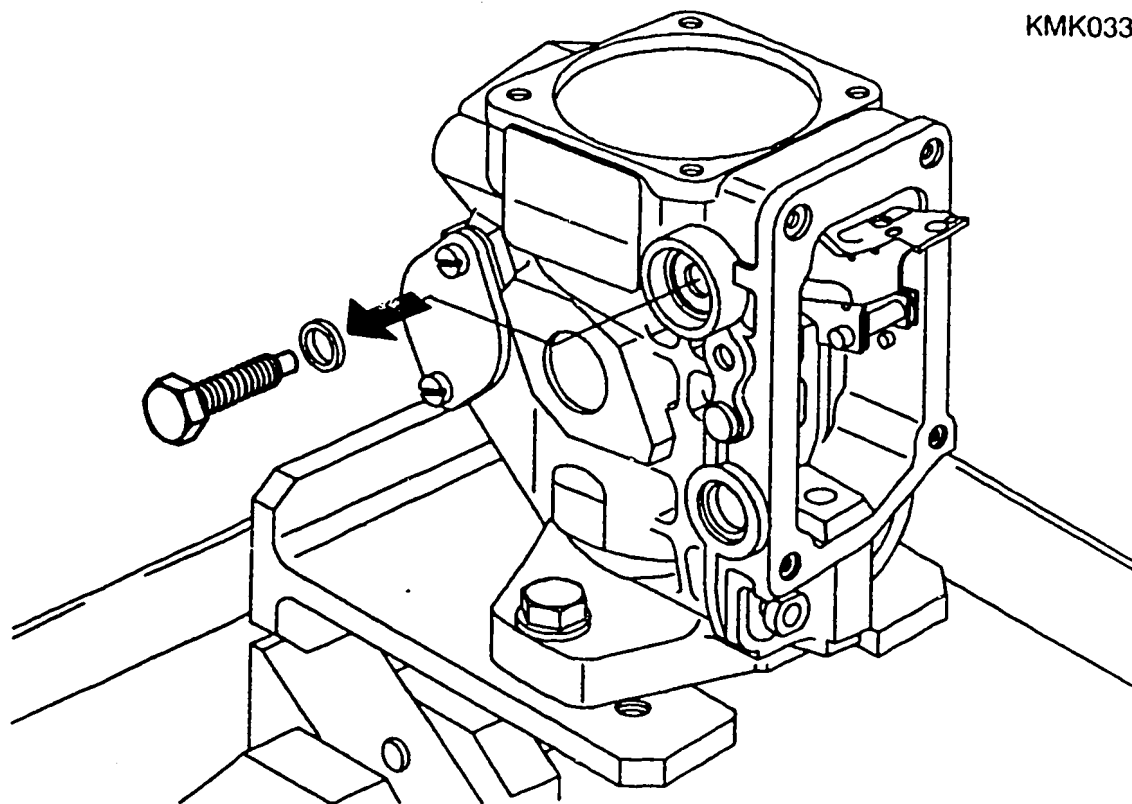


REMOVING FULCRUM LEVER ASSEMBLY

Loosen and remove side triangle-head bolts with KDEP 1087.

Remove fulcrum lever assembly made up of starting lever, tensioning lever and correction lever.

Continue: E13/1 Fig.: E12/2



KMK03337

REMOVING SLOTTED WASHER

1 = Slotted washer

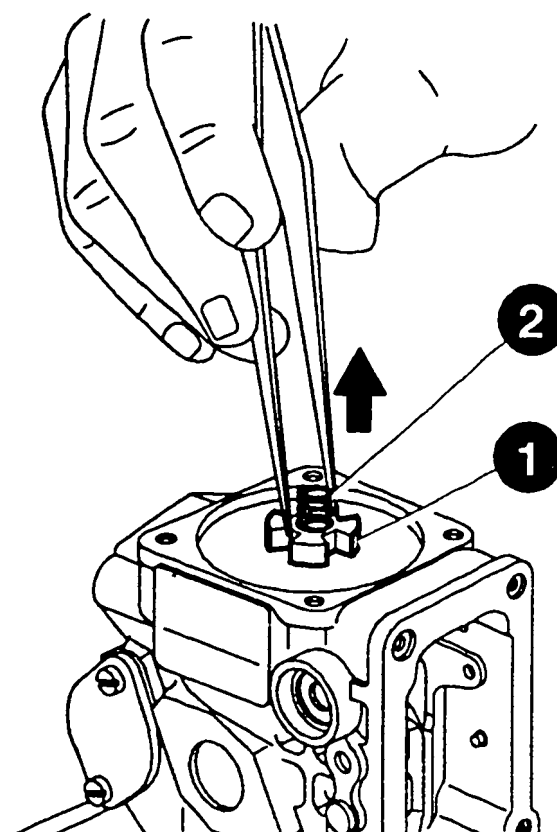
2 = Compression spring

Remove slotted washer together with
compression spring.

Make sure that compression spring is
not lost.

Continue: E14/1 Fig.: E13/2

KMK03338



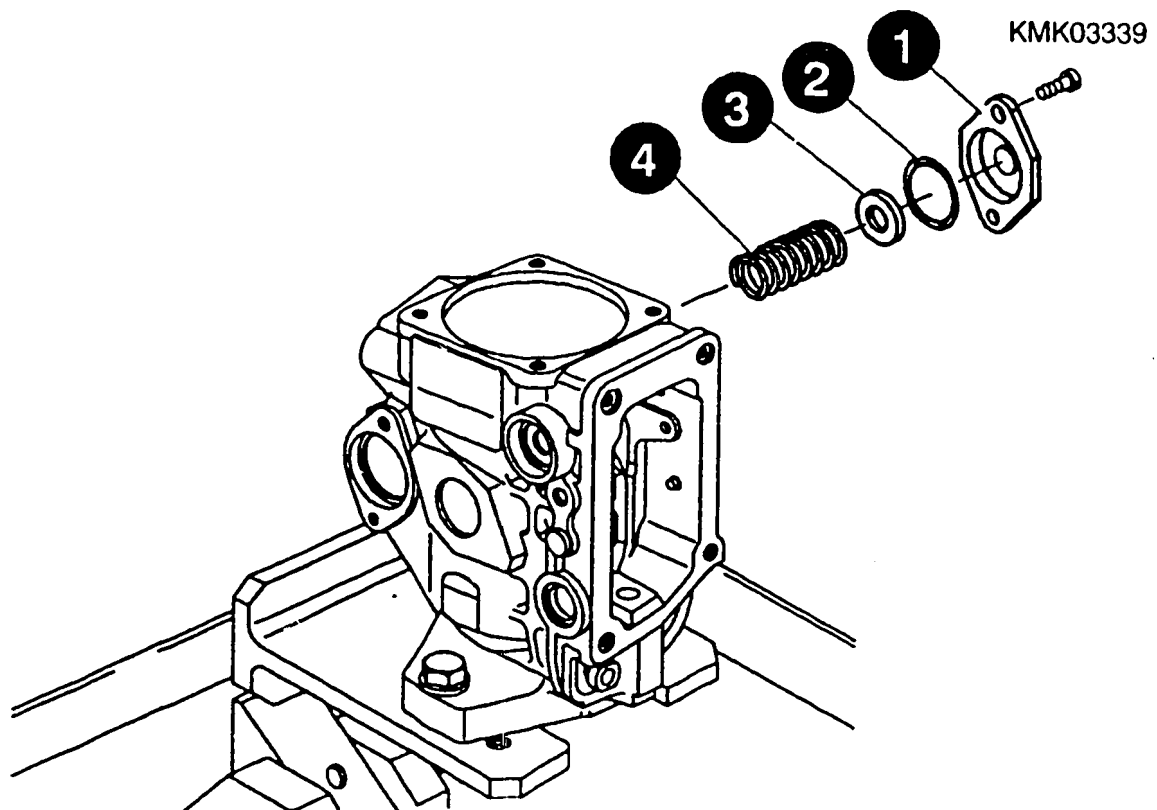
DISASSEMBLING TIMING DEVICE

- 1 = Closing cover
- 2 = Seal ring
- 3 = Shim
- 4 = Compression spring

Unscrew closing cover (spring side)
with shims.

Remove seal ring; remove compression
spring and shim from timing-device
piston (not visible in picture).

Continue: E15/1 Fig.: E14/2



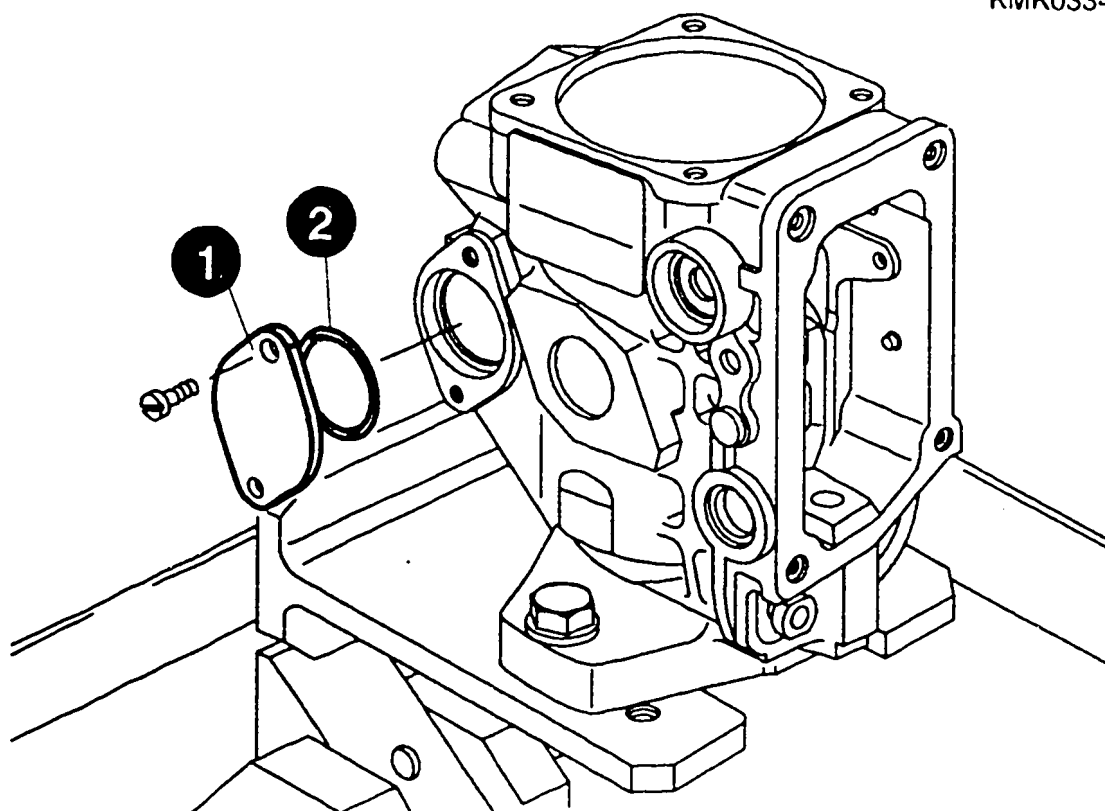
DISASSEMBLING TIMING DEVICE

- 1 = Seal ring
- 2 = Cover plate

Unscrew cover plate and remove seal ring.

Continue: E16/1 Fig.: E15/2

KMK03340



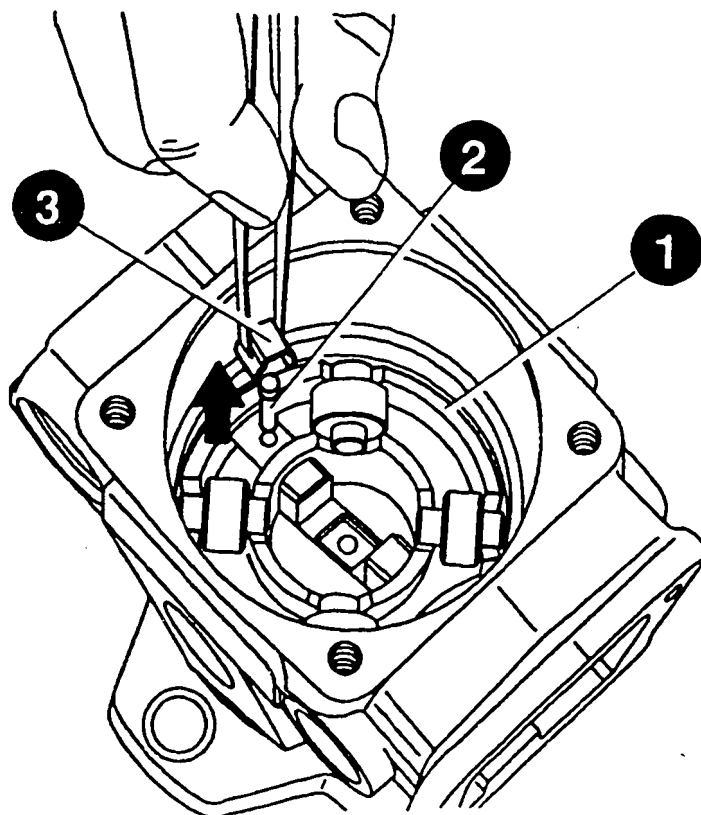
REMOVING CAM ROLLER RING AND TIMING-DEVICE PISTON

- 1 = Cam roller ring
- 2 = Retaining pin
- 3 = Retaining bracket

Pull off retaining bracket.
Pull out retaining pin with pointed
pliers.

Continue: E17/1 Fig.: E16/2

KMK03341



REMOVING CAM ROLLER RING AND TIMING-DEVICE PISTON

1 = Claws

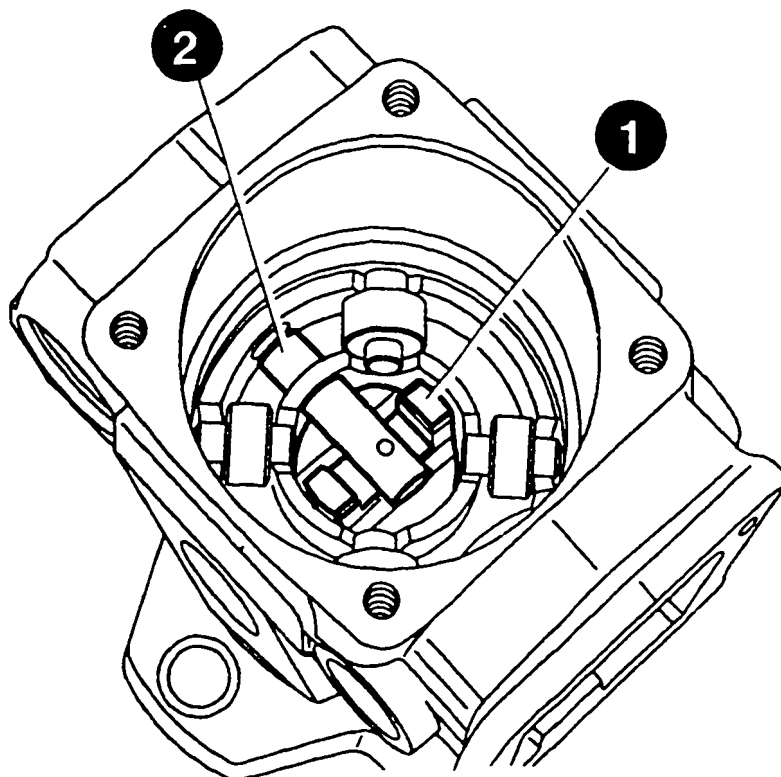
2 = Sliding bolt

Set claws of drive shaft to transverse position.

Push sliding bolt in direction of center of cam roller ring (arrow).

Continue: E18/1 Fig.: E17/2

KMK03342

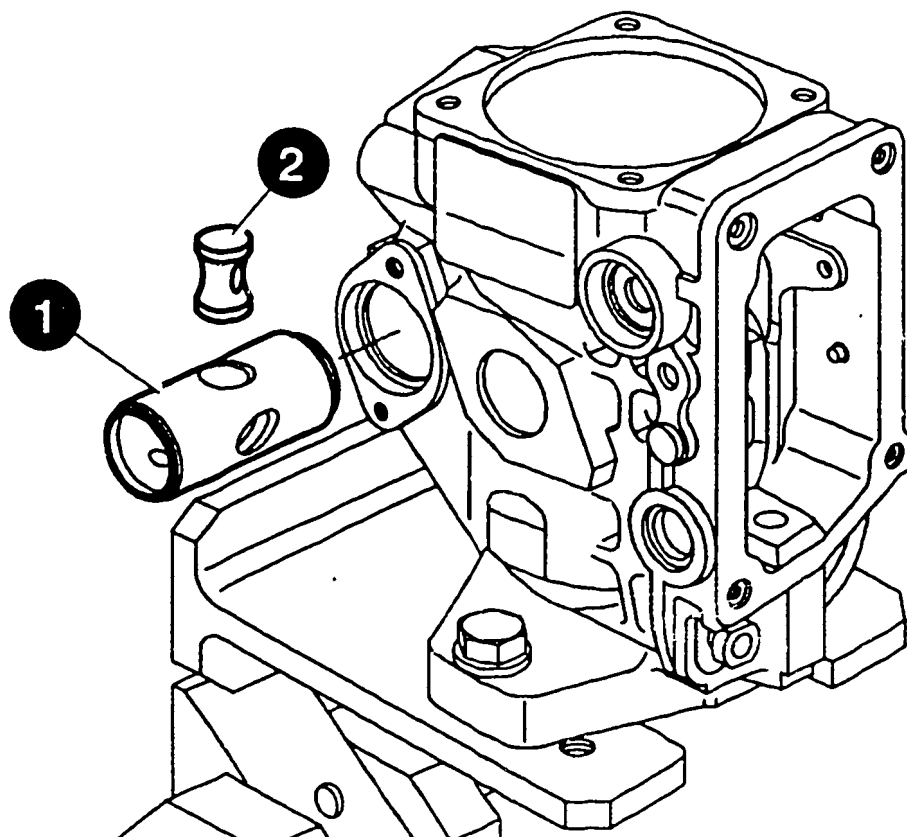


REMOVING CAM ROLLER RING AND TIMING-DEVICE PISTON

- 1 = Timing-device piston
- 2 = Sliding piece

Push out timing-device piston including sliding piece (pay attention to sliding piece!).
If applicable, remove closing cover on side for pointer adjustment, remove seal ring and unscrew adjustment plate.

Continue: E19/1 Fig.: E18/2



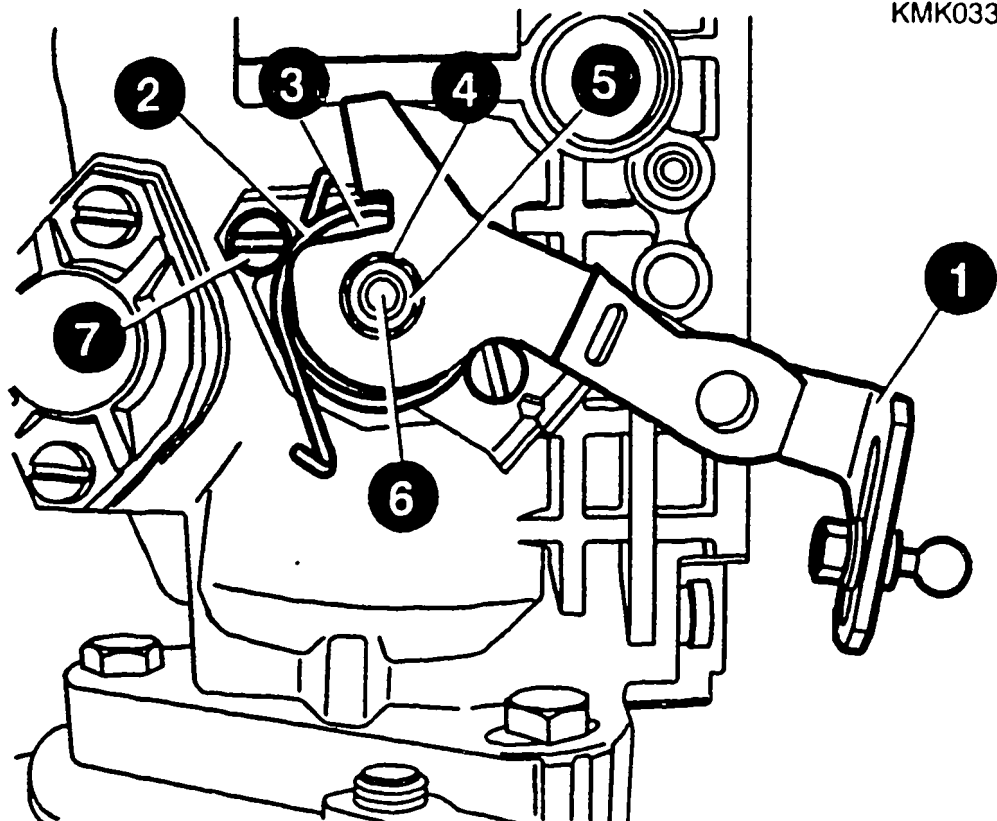
KMK03343

REMOVING TEMPERATURE-CONTROLLED COLD
START ACCELERATION DEVICE (KSB) ACTING
ON CAM ROLLER RING

- 1 = Control lever
- 2 = Cylindrical helical coiled spring
- 3 = Shim
- 4 = Spring lock washer
- 5 = Hexagon nut
- 6 = Setting shaft
- 7 = Fillister-head screw

Disengage cylindrical helical coiled spring at control lever. Remove hexagon nut with spring lock washer. Pull control lever off setting shaft. Remove fillister-head screws and spring lock washers.

Continue: E20/1 Fig.: E19/2



KMK03344

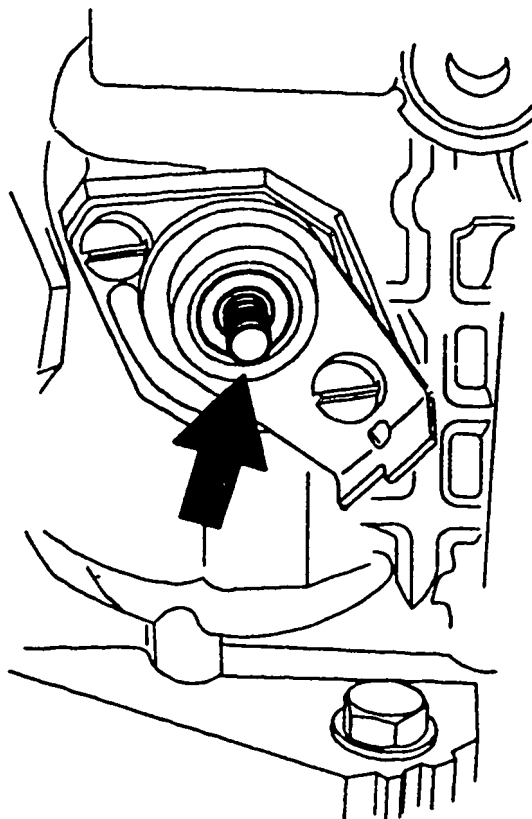
REMOVING TEMPERATURE-CONTROLLED COLD
START ACCELERATION DEVICE (KSB) ACTING
ON CAM ROLLER RING

Arrow = Setting shaft

Remove fitting cover complete with
setting shaft from distributor-type
fuel-injection pump.
Remove O-ring from pump housing.

Continue: E21/1 Fig.: E20/2

KMK03345



REMOVING CAM ROLLER RING

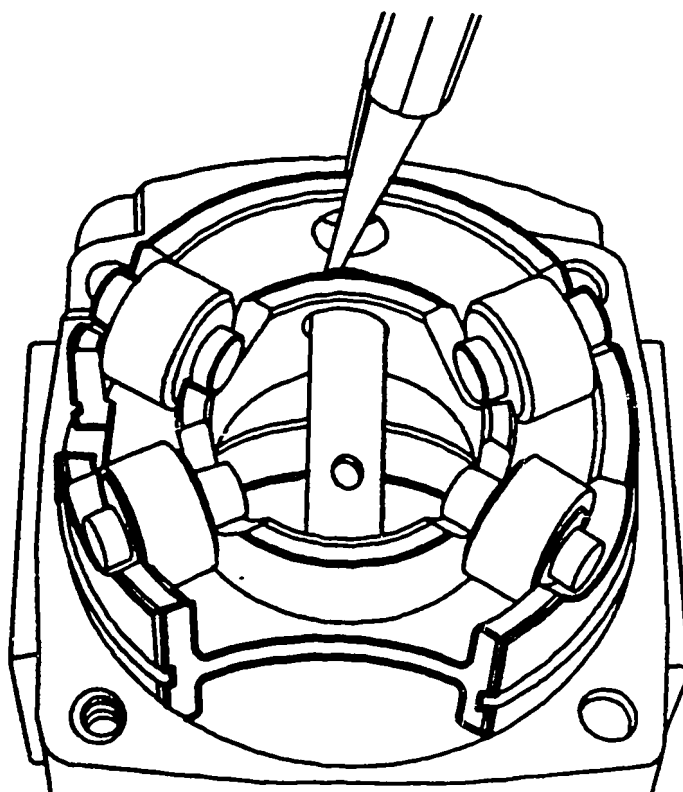
Lift out cam roller ring with rollers
taking care not to tilt it.

Note:

Do not interchange rollers!

Continue: E22/1 Fig.: E21/2

KMK03346



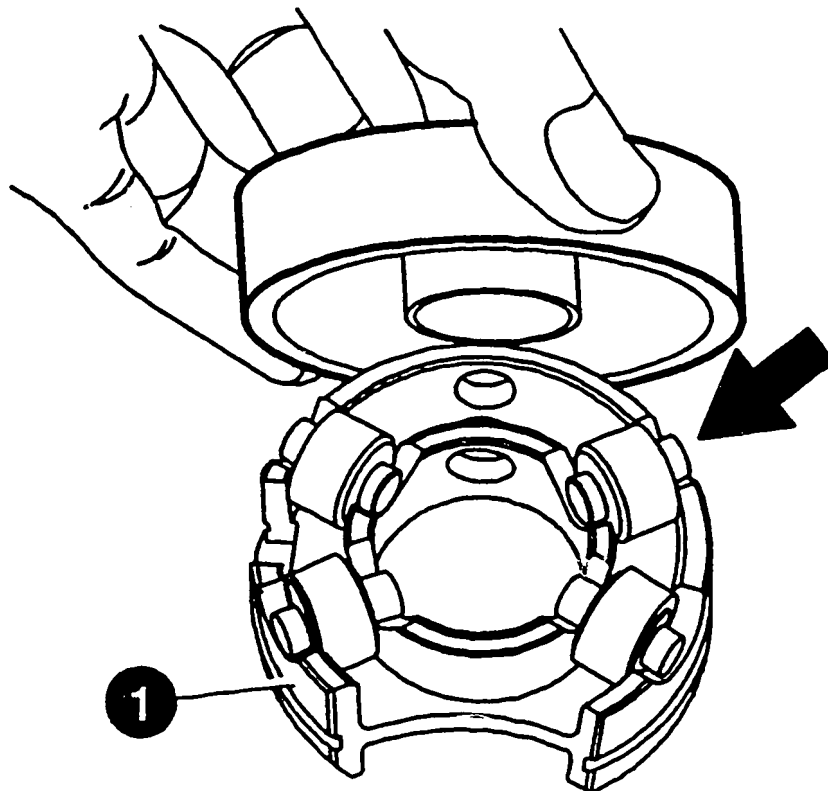
REMOVING CAM ROLLER RING

1 = Cam roller ring

Push sliding bolt out of cam roller ring.

Position protective capsule KDEP 1100 over cam roller ring to protect rollers (arrow).

Continue: E23/1 Fig.: E22/2

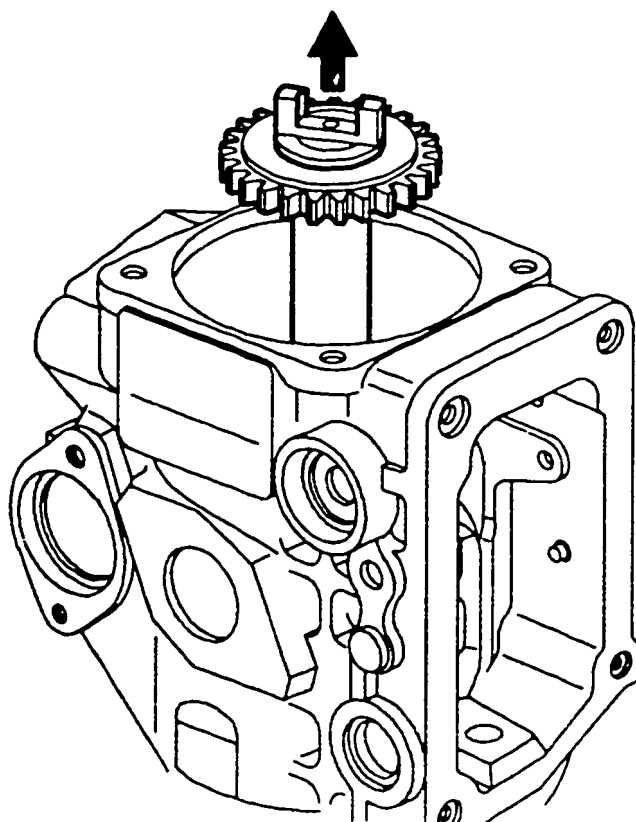


KMK03347

REMOVING DRIVE SHAFT

Remove radial-lip-type oil seal with extractor KDEP 1113 or KDEP 1114 (depending on shaft diameter). Push out drive shaft upwards. Pay attention to Woodruff key.

Continue: E24/1 Fig.: E23/2



KMK03348

REMOVING DRIVE SHAFT

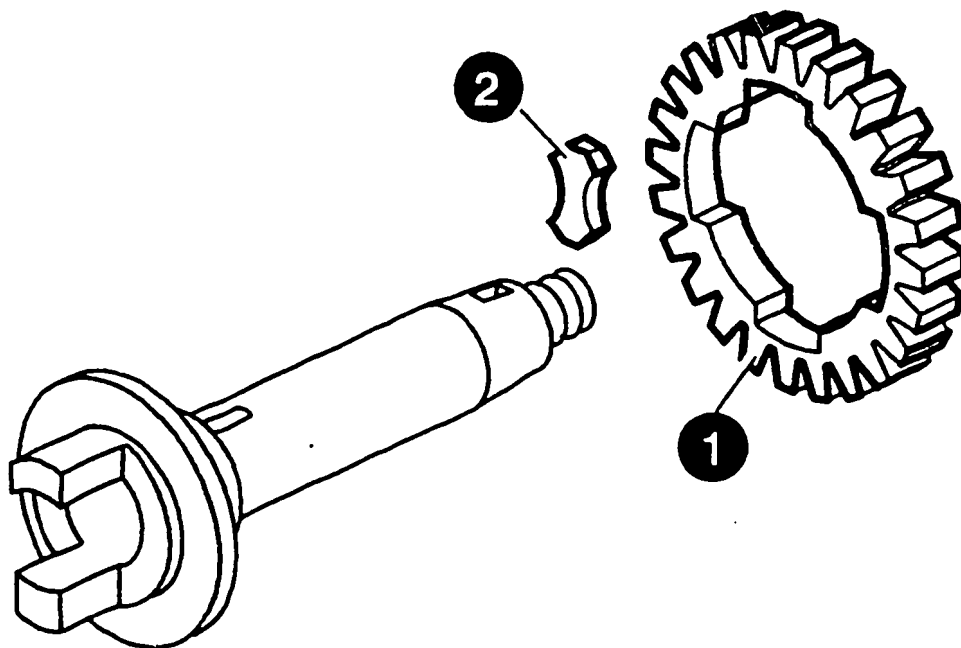
- 1 = Gear wheel
- 2 = Rubber buffer

Remove gear wheel and rubber buffer from drive shaft.

Remove slotted washer from housing.

Continue: E25/1 Fig.: E24/2

KMK03349



REMOVING VANE-TYPE SUPPLY PUMP

1 = Countersunk screws

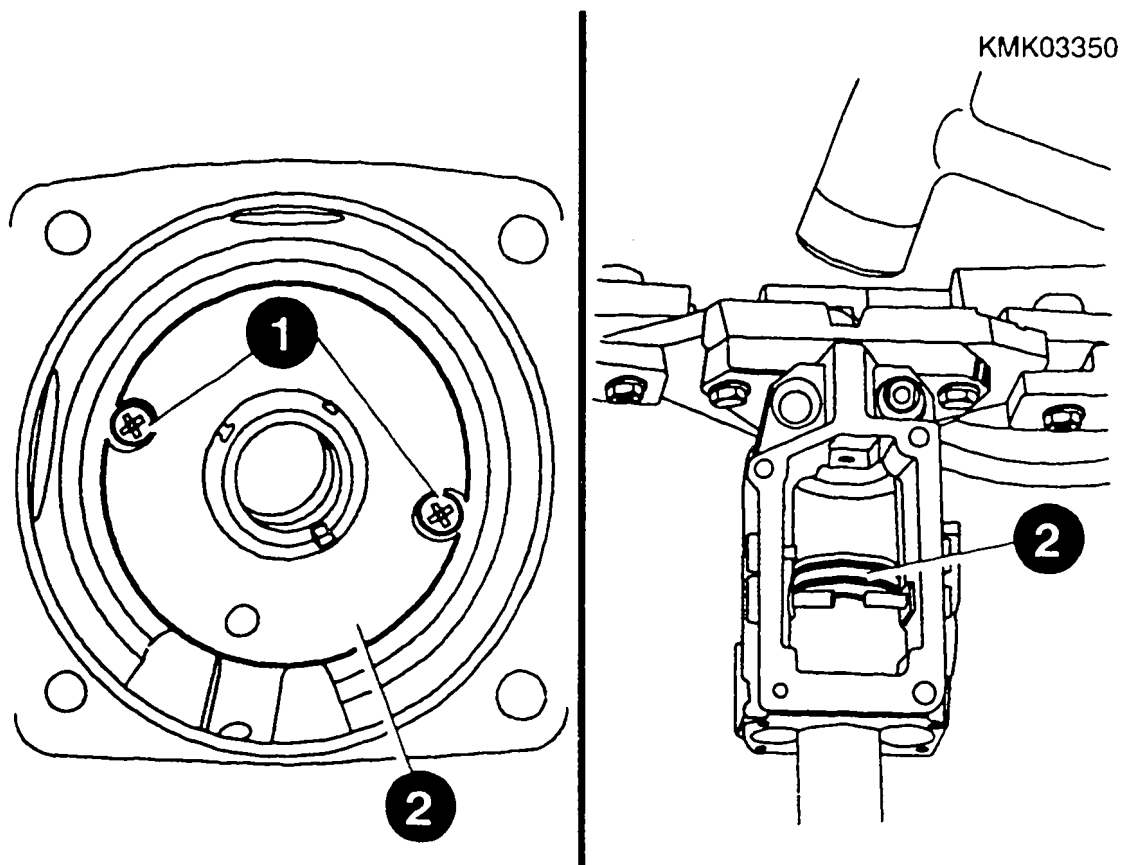
2 = Support ring

Loosen and remove countersunk screws
(picture, left).

Insert assembly tool KDEP 1097 into
pump housing.

Tilt housing downwards; in doing so,
counterhold support ring with holding
mandrel KDEP 1097.

Continue: E26/1 Fig.: E25/2

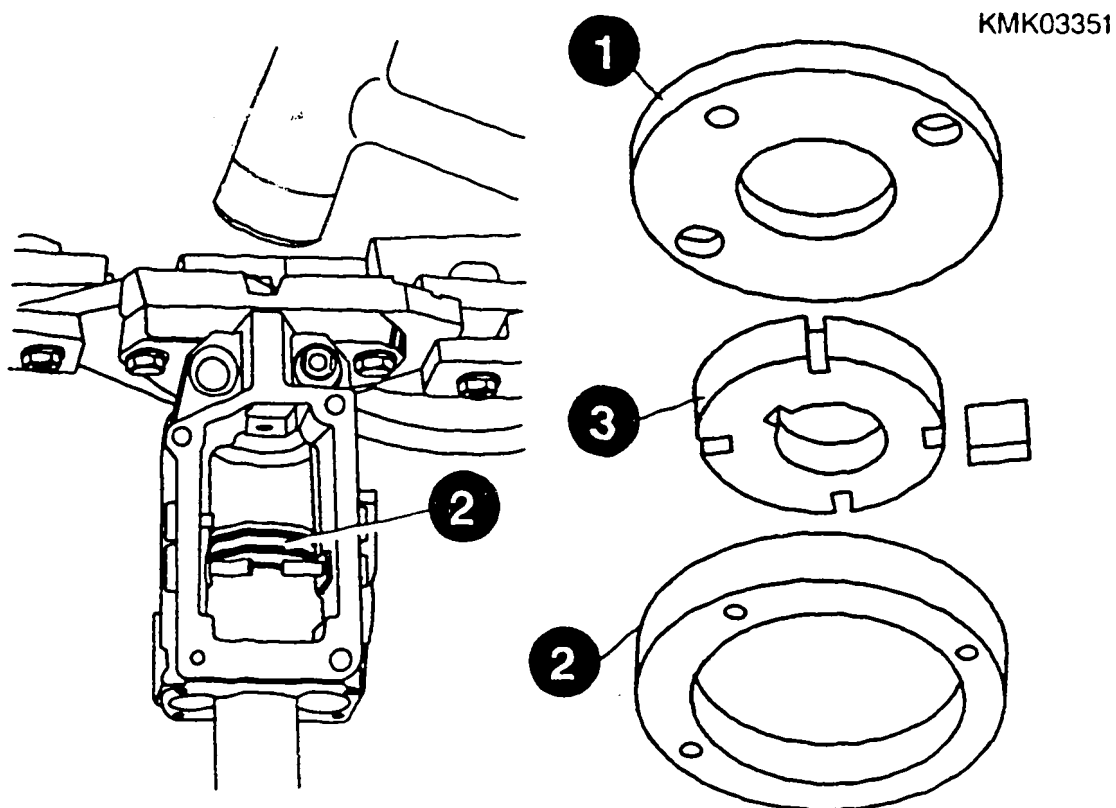


REMOVING VANE-TYPE SUPPLY PUMP

- 1 = Support ring
- 2 = Holding ring
- 3 = Slotted washer with pump vanes

Whilst constantly tapping on pump housing with rubber hammer, remove (downwards) support ring and supply pump consisting of slotted washer with pump vane and holding ring (eccentric ring).

Continue: E27/1 Fig.: E26/2



REMOVING VANE-TYPE SUPPLY PUMP

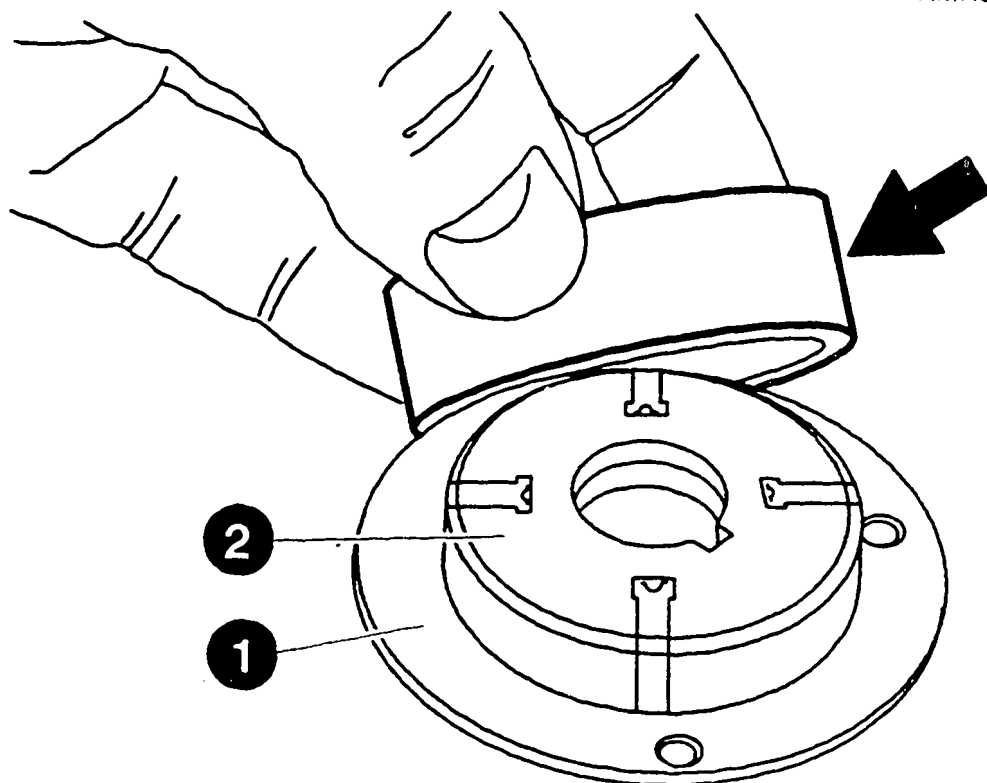
- 1 = Supporting plate
- 2 = Pump impeller

Remove supporting plate with slotted washer from assembly tool KDEP 1097. Position KDEP 1101 (arrow) over supporting plate and pump impeller.

In the event of tilted holding ring, pay attention to operations on Coordinate E28/1.

Holding ring not tilted, continue on Coordinate F03/1

Continue: E28/1 Fig.: E27/1



REMOVING VANE-TYPE SUPPLY PUMP

* Holding ring tilted

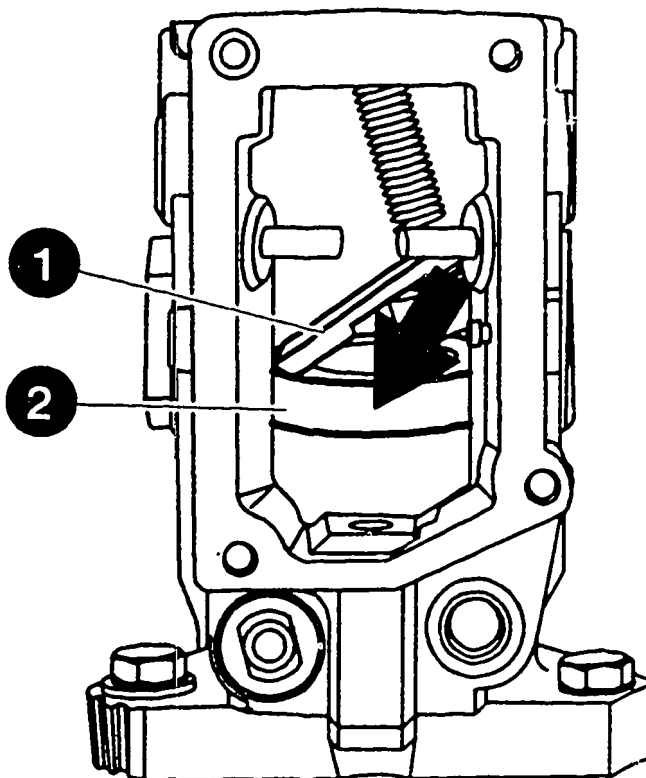
1 = Extractor

2 = Holding ring

Slip extractor of assembly tool KDEP 1097 behind supporting ring (eccentric ring) as shown by arrow.

Continue: F01/1 Fig.: E28/2

KMK03353



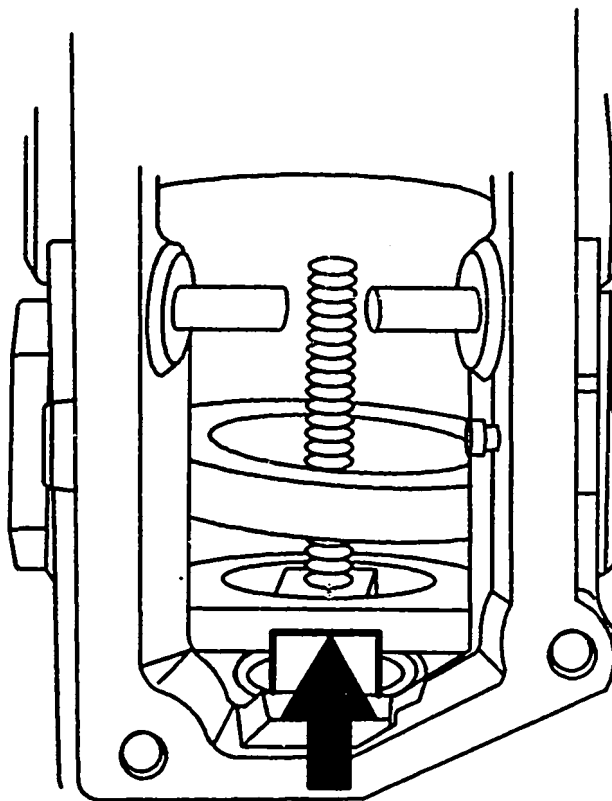
REMOVING VANE-TYPE SUPPLY PUMP

* Holding ring tilted

Centrally align extractor.

The milled surfaces of the threaded pin should be in the groove of the extraction part (arrow).

Continue: F02/1 Fig.: F01/2



KMK03354

REMOVING VANE-TYPE SUPPLY PUMP

* Holding ring tilted

Remove support mandrel of vane-type pump from assembly tool KDEP 1097.

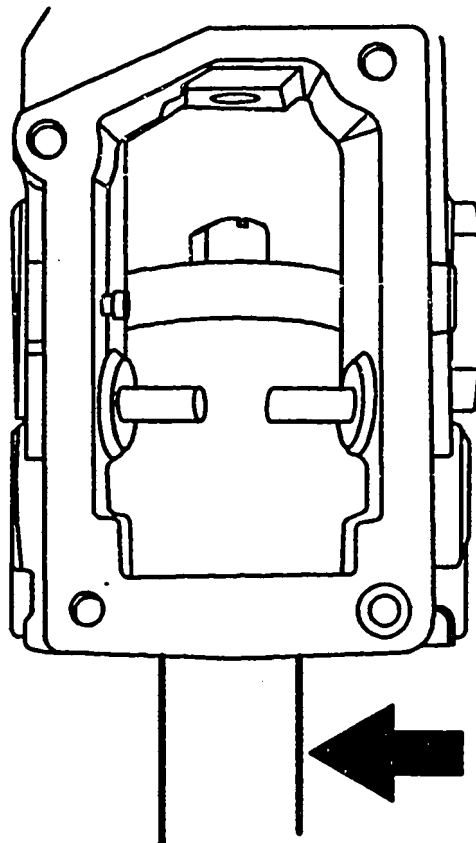
Insert assembly tool (arrow) into pump housing and screw onto threaded pin.

The holding ring (eccentric ring) is thus pulled towards the assembly tool.

Pull assembly tool with holding ring out of pump housing.

Check for damage and abrasion on inside of pump housing.

Continue: F03/1 Fig.: F02/2



KMK03355

DISASSEMBLING CONTROL DEVICE OF
TEMPERATURE-CONTROLLED IDLE INCREASE
(TLA)

- 1 = Control device
- 2 = Hexagon-socket-head cap screws
- 3 = Support plate

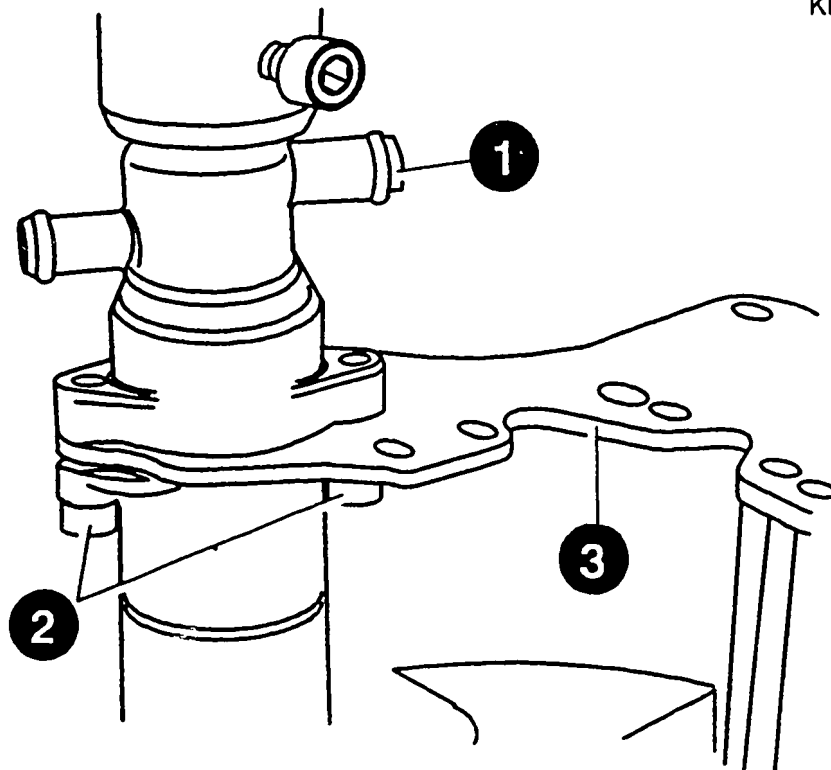
Insert control device into assembly
device KDEP 1109.

Slightly squeeze control device
together with mandrel press.

Screw out hexagon-socket-head cap
screws.

Continue: F04/1 Fig.: F03/2

KMK03356



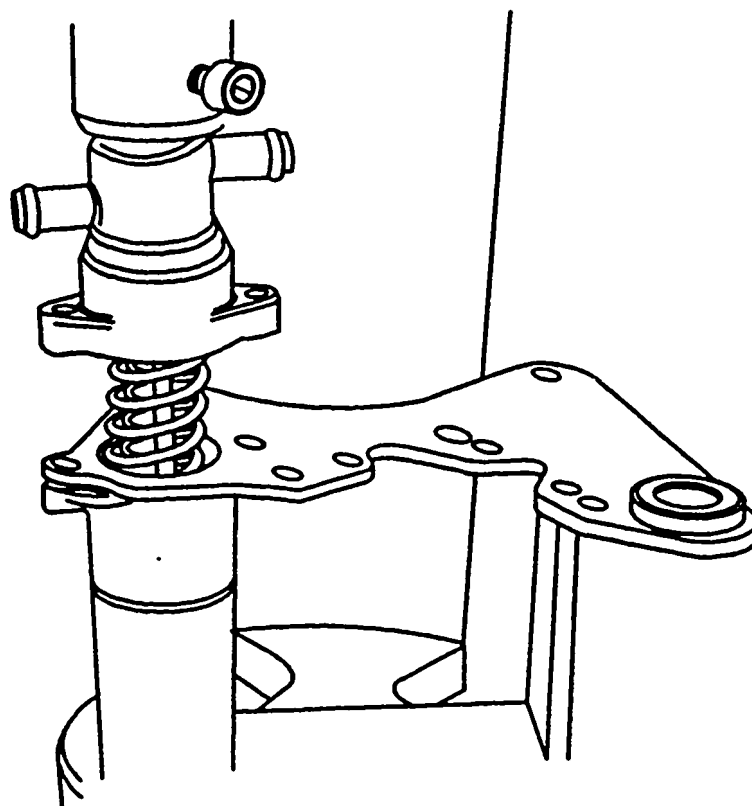
DISASSEMBLING CONTROL DEVICE OF
TEMPERATURE-CONTROLLED IDLE INCREASE
(TLA)

Relieve tension on compression springs
of control device.

Remove both compression springs.

Remove spring seat with cable.

Continue: F05/1 Fig.: F04/2



KMK03357

DISASSEMBLING CONTROL DEVICE OF
TEMPERATURE-CONTROLLED IDLE INCREASE
(TLA)

Clamp control device with protective
jaws in vice.

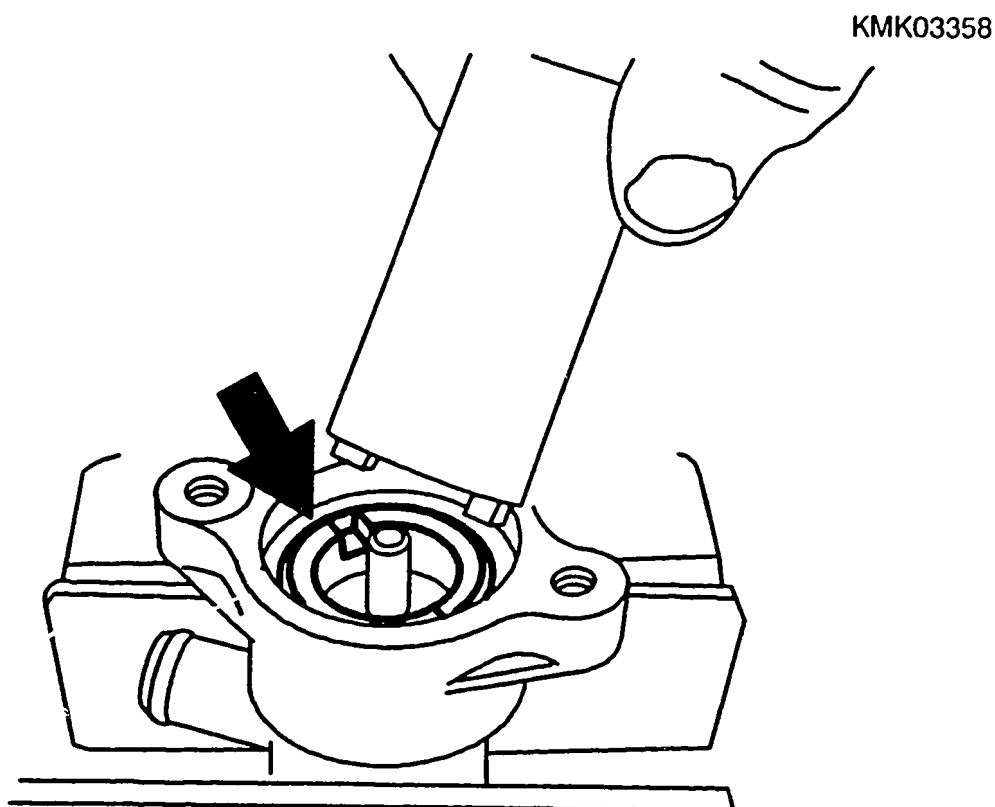
Screw out threaded ring (arrow) with
pin-type socket wrench KDEP 1110.

Remove thermostat and O-ring from
housing.

NOTE:

Do not pull pin out of thermostat.

Continue: F06/1 Fig.: F05/2



CLEANING OF COMPONENT PARTS

Wash out component parts in commercially available cleaner such as chlorothene NU which is not readily flammable. Then blow out with compressed air.

Continue: F06/2

CLEANING OF COMPONENT PARTS

Pay attention to the following safety precautions:

Order Governing Work with Flammable Liquids (Vbf) as issued by Federal Labor Ministry (BmA).

Safety regulations for handling chlorinated hydrocarbons:

For companies ZH 1/222

For employees ZH 1/129

as published by the Hauptverband für gewerbliche Berufsgenossenschaften (Zentralverband für Unfallschutz und Arbeitsmedizin),

Langwartweg 103, 5300 Bonn 5.

The appropriate local regulations are to be observed in other countries.

Continue: F07/1

**CHECKING INDIVIDUAL COMPONENT
PARTS - WEAR ASSESSMENT**

Renew worn and damaged parts.

The helices of the distributor-pump plunger must be sharp and there must not be any pronounced tracking on the running surfaces. Distributor-pump plunger and control spool, cam roller ring with rollers and spring seat, slotted washer with pump vane and holding ring are to be viewed as a unit and renewed together in each case (service part assemblies)!

Use must always be made of new seal rings and O-rings when performing repairs.

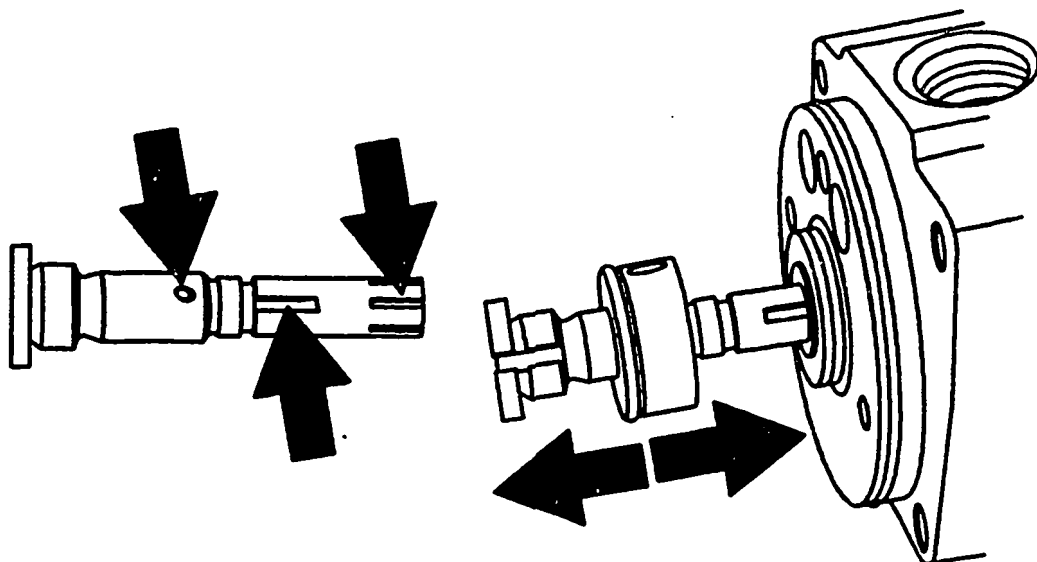
Continue: F08/1

CHECKING INDIVIDUAL COMPONENT PARTS - WEAR ASSESSMENT

Particular attention is to be paid to the sharpness of the helices on the distributor-pump plunger (picture, left). A check is likewise to be made on the freedom of movement of the distributor-pump plunger in the distributor head and control spool (picture, right). If one of these component parts reveals pronounced signs of tracking, distributor head must be renewed complete with distributor-pump plunger and control spool. These parts are paired in terms of dimensions and cannot be individually replaced.

Continue: F09/1 Fig.: F08/2

KMK03359



CHECKING INDIVIDUAL COMPONENT
PARTS - WEAR ASSESSMENT

Ultimate assessment of the wear of the distributor-pump plunger with distributor head and control spool is only possible on a test bench.

Continue: F10/1

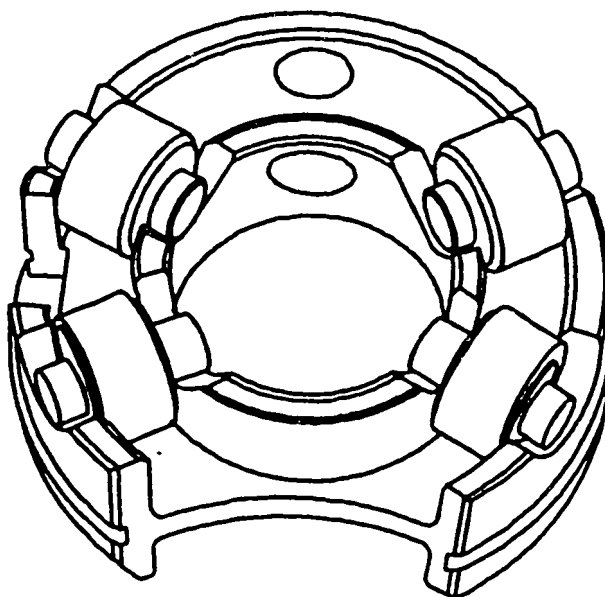
CHECKING INDIVIDUAL COMPONENT PARTS – WEAR ASSESSMENT

Clean cam roller ring with fitted protective capsule KDEP 1100 in cold cleaner (wash out).

Check condition of rollers and freedom of movement. (In doing so, do not take rollers out of cam roller ring).

Continue: F11/1 Fig.: F10/2

KMK03360

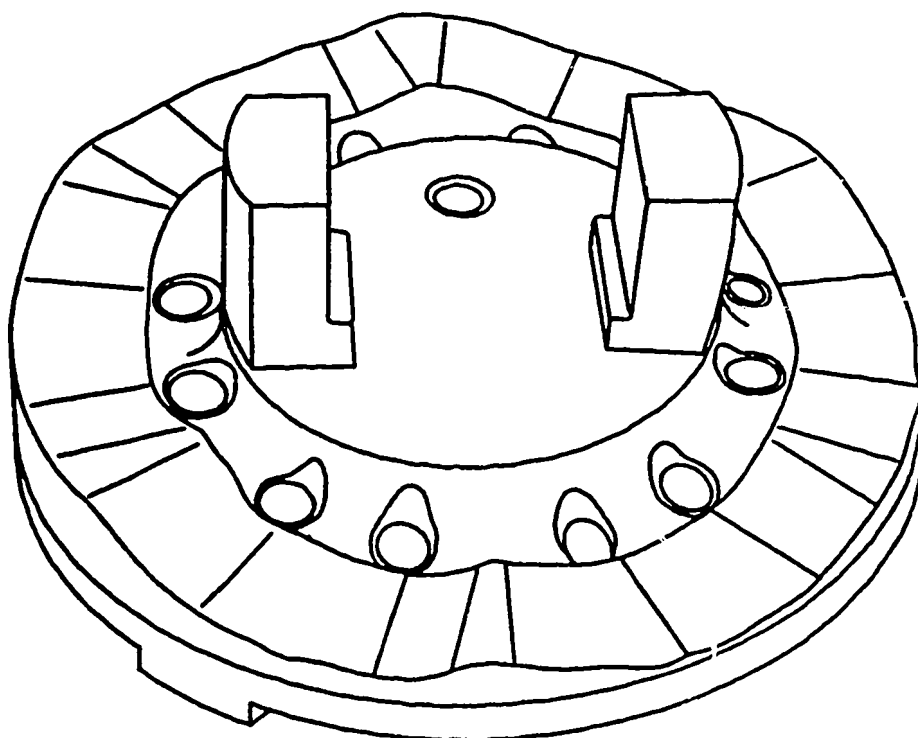


CHECKING INDIVIDUAL COMPONENT PARTS - WEAR ASSESSMENT

Check camways of cam plate for wear.
Cam plate must be renewed if it shows
signs of tracking or blue tarnishing.
In such cases, it may be necessary to
replace the complete cam roller ring
since the rollers will probably also
be very worn.

Continue: F12/1 Fig.: F11/2

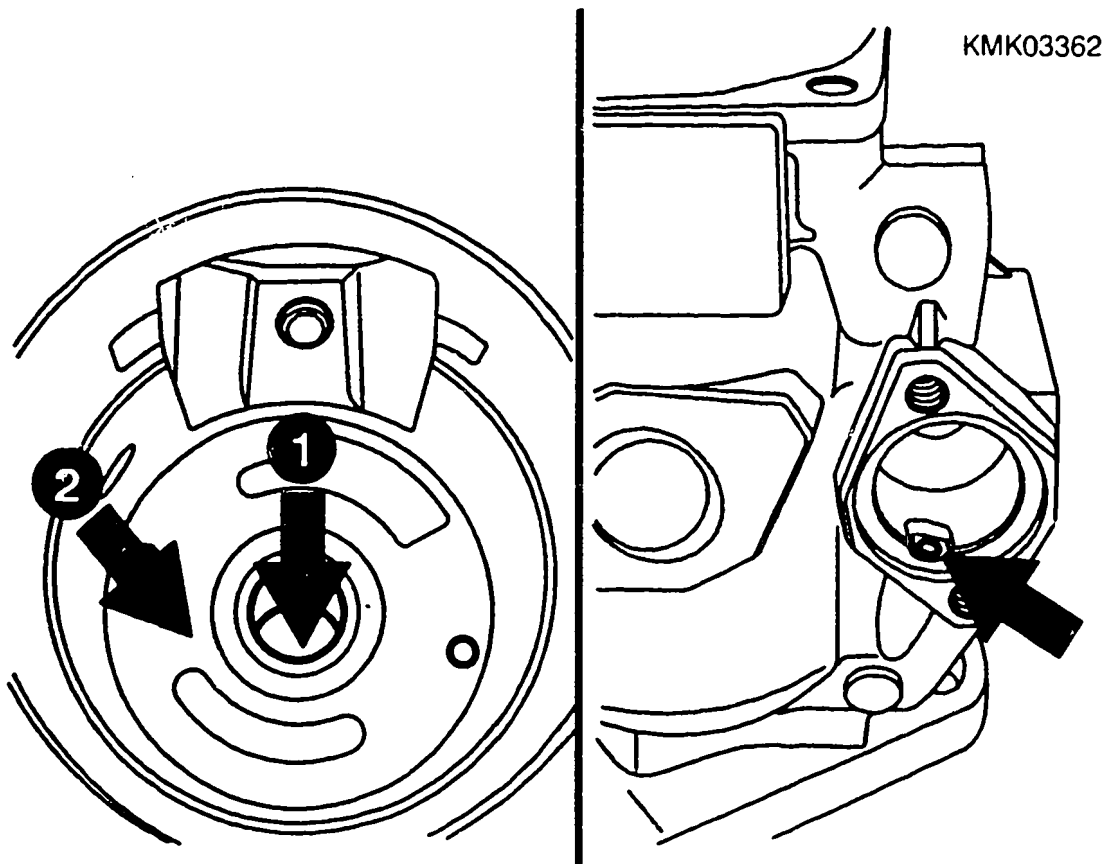
KMK03361



CHECKING INDIVIDUAL COMPONENT PARTS - WEAR ASSESSMENT

Check for scoring on plain bearing in pump housing (arrow 1) as well as on stopping surface of supply pump at bottom of housing (arrow 2) and in hole for timing device (arrow, right picture).

Continue: F13/1 Fig.: F12/2

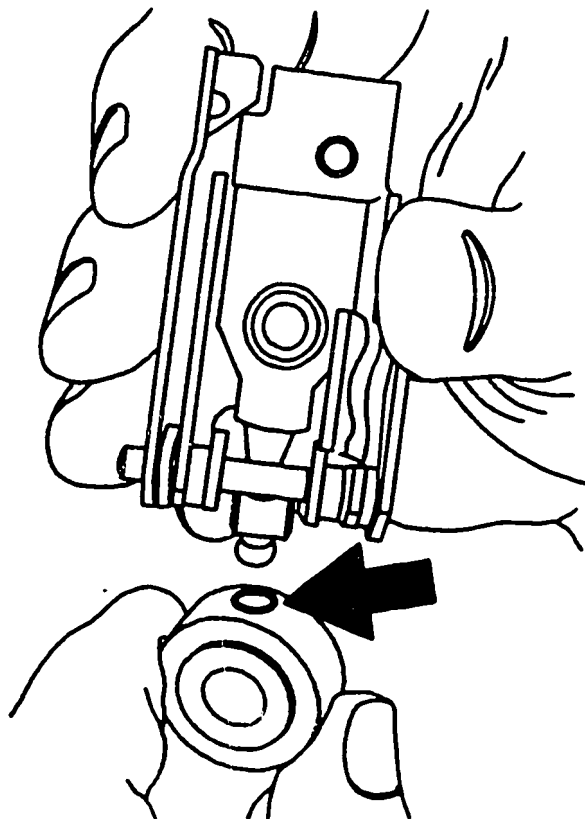


CHECKING INDIVIDUAL COMPONENT PARTS - WEAR ASSESSMENT

Check freedom of movement and tightness of ball stud of fulcrum lever assembly in control-spool bore (arrow).

If necessary, renew fulcrum-lever assembly/control spool including distributor-pump plunger and distributor head.

Continue: F14/1 Fig.: F13/2



KMK03363

REPLACING BUSHINGS (1-PIECE) OF DRIVE SHAFT

* Special tools required:

Tool set KDEP 1170 for drive shaft
diameter 17.0 mm comprising:

- * Pressing-out mandrel KDEP 1170/1
- * Pressing-in mandrel KDEP 1170/2
Pressing in inner bushing
- * Pressing-in mandrel KDEP 1170/3
Pressing in outer bushing
- * Guide sleeve KDEP 1170/4
- * Hand reamer KDEP 1170/5
- * Support KDEP 1170/6

Continue: F14/2

REPLACING BUSHINGS OF DRIVE SHAFT

Tool set KDEP 1171 for drive shaft
diameter 20.0 mm comprising:

- * Pressing-out mandrel KDEP 1171/1
- * Pressing-in mandrel KDEP 1171/2
(Pressing in inner bushing)
- * Pressing-in mandrel KDEP 1171/3
(Pressing in outer bushing)
- * Guide sleeve KDEP 1171/4
- * Hand reamer KDEP 1171/5

Note:

Use support KDEP 1170/6 to guide
pressing-in mandrel KDEP 1171/2 and
hand reamer.

Continue: F15/1

PRESSING IN DRIVE SHAFT BEARING

- Version: 2-piece bushing

Select further adjustment in line with following features:

- * Pressing out bushing, diameter
17 mm and 20 mm F16/1
- * Pressing in bushing F17/1
- * Reaming out bushing, diameter
20 mm F20/1
- * Reaming out bushing, diameter
17 mm F22/1

- Version: 1-piece bushing F25/1

Continue: F16/1

REPLACING BUSHINGS OF DRIVE SHAFT

Arrow = Pressing-out mandrel

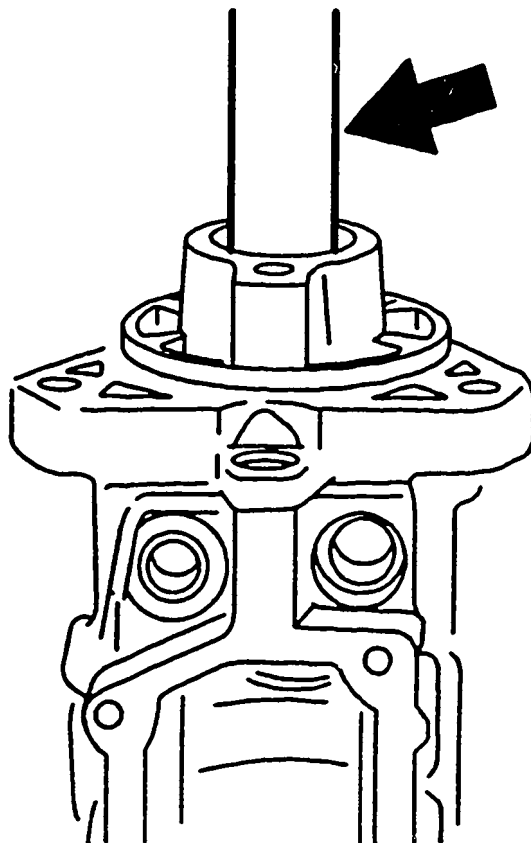
Position injection-pump housing with support KDEP 1170/6 flat on mounting plate of mandrel press.

Remove any burr on pump housing (end face of distributor head).

Press out bushings on drive end with pressing-out mandrel depending on drive shaft diameter.

Wash out VE housing; there must be no grease in hole.

Continue: F17/1 Fig.: F16/2



KMK03364

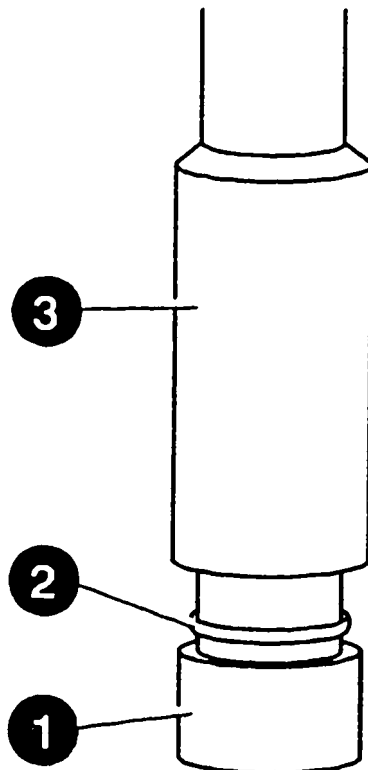
PRESSING IN BUSHINGS

- 1 = Bushing
- 2 = O-ring
- 3 = Pressing-in mandrel

Position pump housing flat on mounting plate of mandrel press on drive end. Slip new bushing over O-ring of pressing-in mandrel depending on drive shaft diameter.

Continue: F18/1 Fig.: F17/2

KMK03365



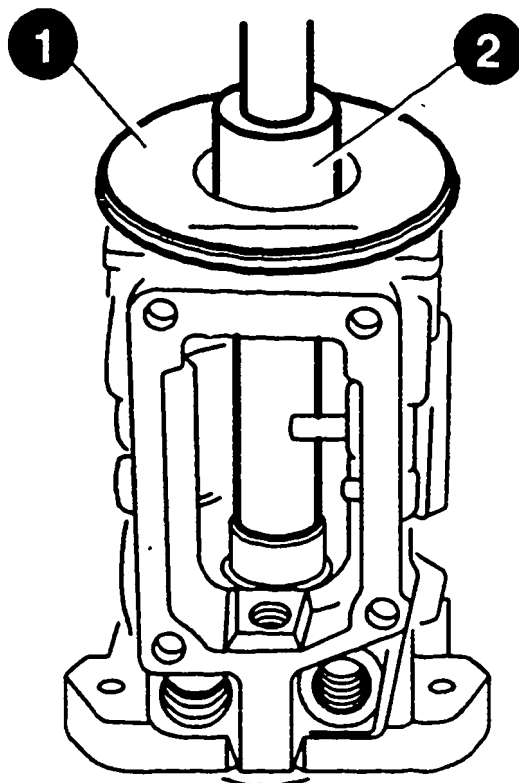
PRESSING IN BUSHINGS

- 1 = Support ring
- 2 = Guide sleeve

Apply Loctite 582 to O.D. of bushing.
Insert support ring into pump housing.
Place guide sleeve in support ring.
Press inner bushing straight and flush
into pump housing until contact is
made.

Continue: F19/1 Fig.: F18/2

KMK03366



PRESSING IN BUSHINGS

Arrow = Pressing-in mandrel with
long guide pin

Insert support KDEP 1170/6 in pump
housing.

Position injection-pump housing with
support on mounting plate of mandrel
press.

Mount bushing in pressing-in bushing
with long guide pin.

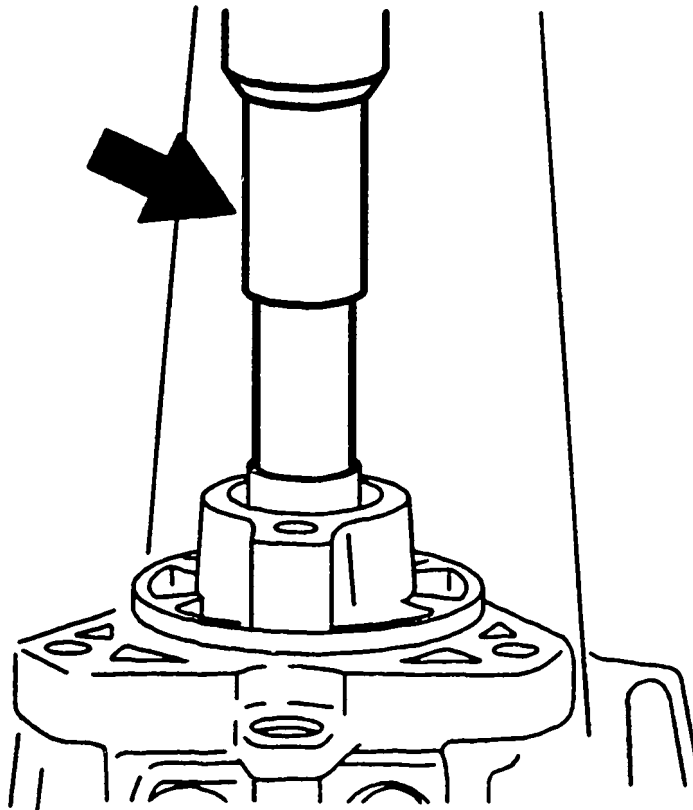
Apply Loctite 582 to O.D. of bushing.

Insert pressing-in mandrel into
bushing already pressed in and press
in bushing flush on drive end.

Remove residual adhesive.

Continue: F20/1 Fig.: F19/2

KMK03367



REAMING OUT BUSHINGS

– Shaft diameter 20 mm

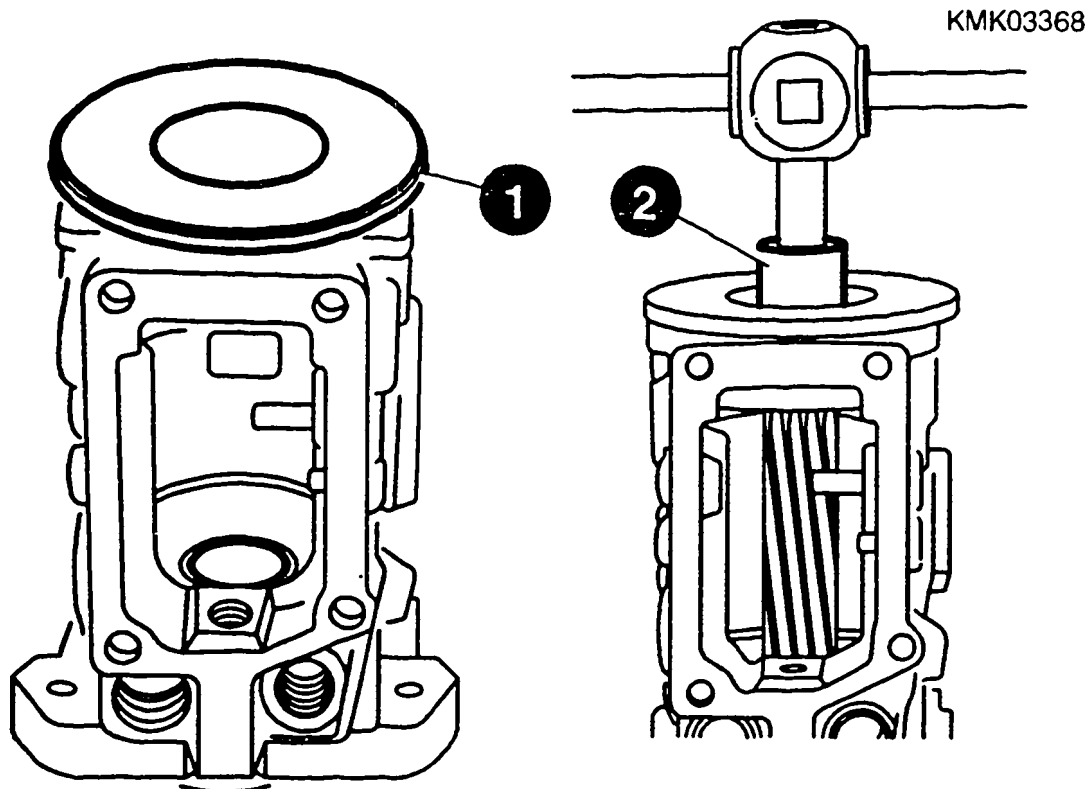
Shaft diameter 17 mm, continue as per
Coordinate F22/1

1 = Support ring

2 = Guide sleeve

Place injection-pump housing flat on
support plate on drive end. Insert
support ring into pump housing.
Insert hand reamer into support ring.
Insert guide sleeve in line with
reamer diameter in support ring.
(Shouldered collar faces upwards).

Continue: F21/1 Fig.: F20/2



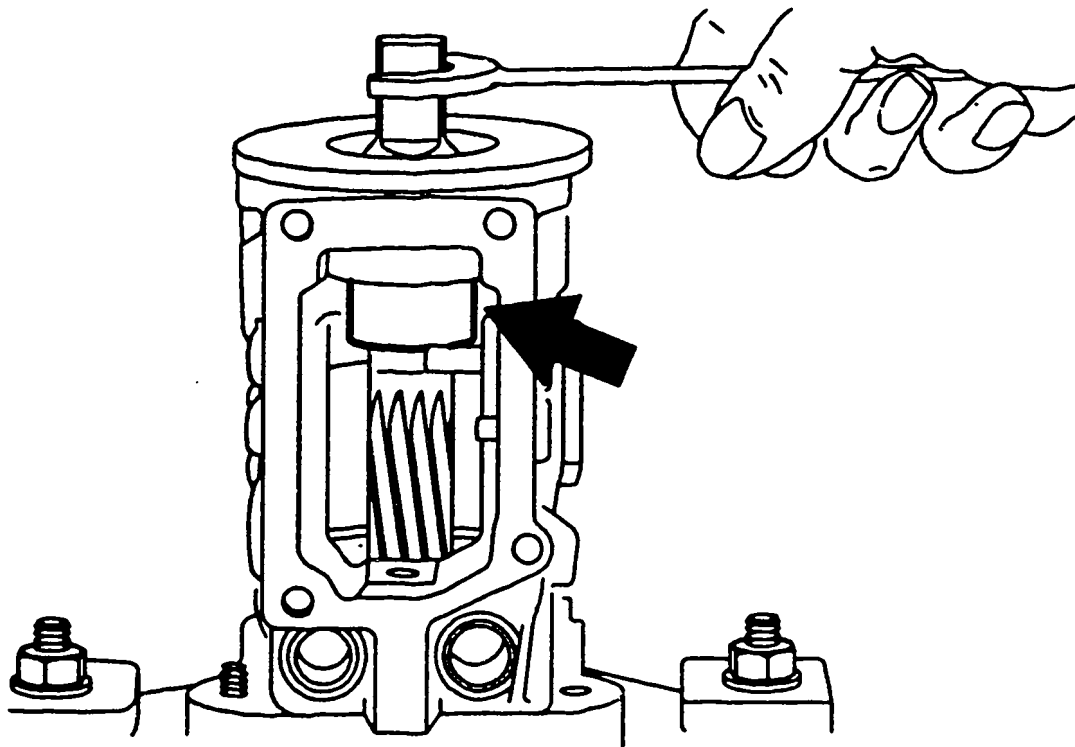
REAMING OUT BUSHINGS
- Shaft diameter 20 mm

Place wrench on reamer and ream out inner bushing with oil.
Turn guide sleeve (shouldered collar diameter faces towards pump housing - arrow).

Ream out second bushing.
Ream last 2 cm with guide sleeve and open-ended wrench.
Insert drive shaft and check for freedom of movement.
Make repair mark.

Continue: G05/1 Fig.: F21/2

KMK03369



REAMING OUT BUSHINGS

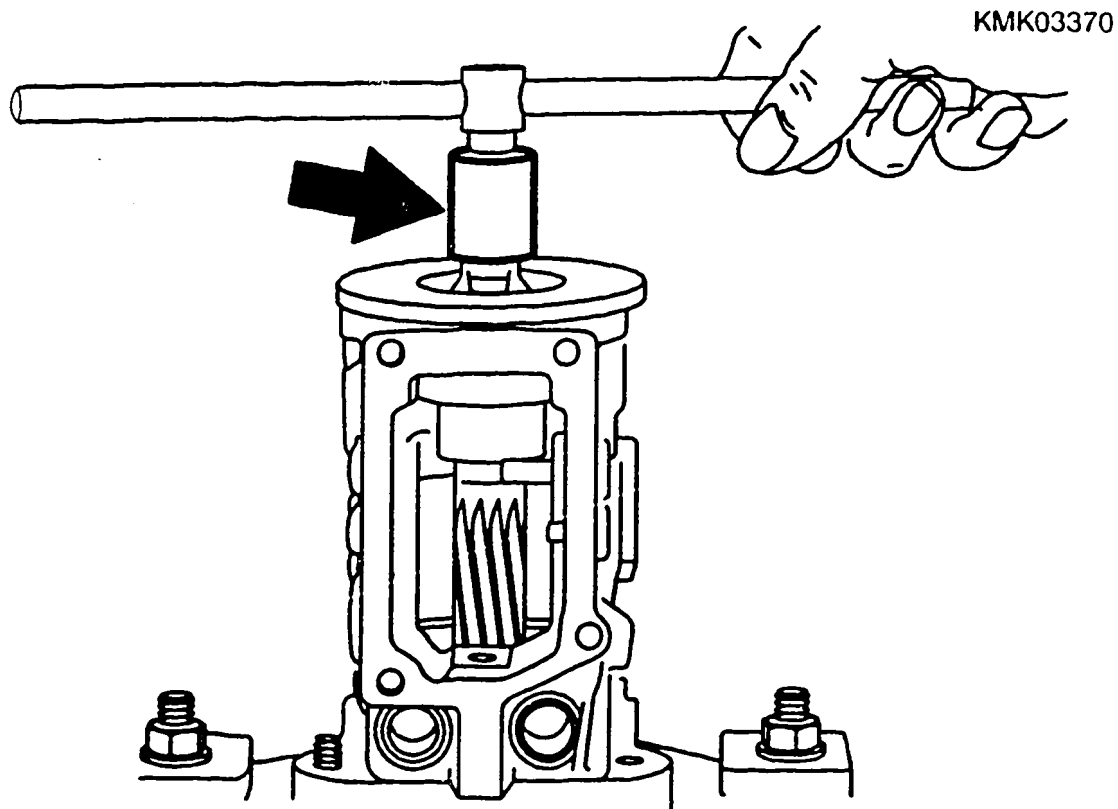
- Shaft diameter 17 mm

Arrow = Intermediate piece

Place injection-pump housing flat on support plate on drive end. Insert support ring into pump housing. Insert hand reamer into support ring. Insert guide sleeve in line with reamer diameter in support ring.
* Shouldered collar faces upwards.

Insert intermediate piece into square of hand reamer.

Continue: F23/1 Fig.: F22/2



REAMING OUT BUSHINGS
- Shaft diameter 17 mm

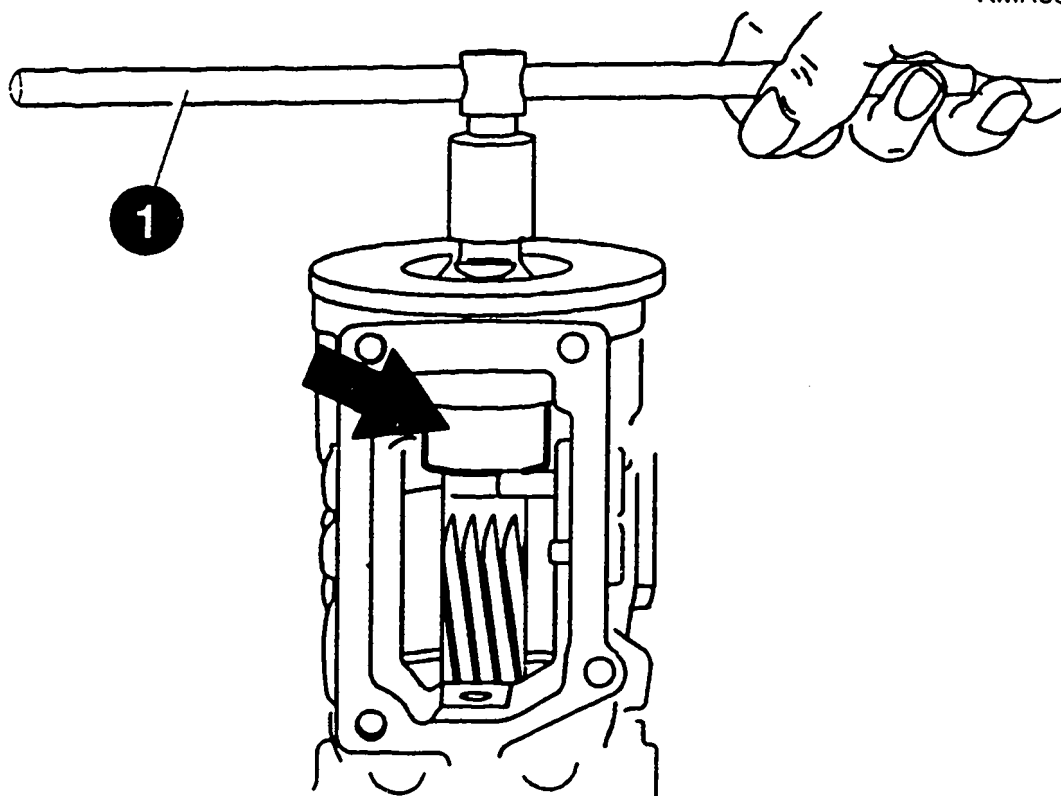
1 = Toggle

Insert toggle in intermediate piece.
Ream out inner bushing with oil.

Turn guide sleeve (shouldered collar
diameter faces pump housing - arrow).

Continue: F24/1 Fig.: F23/2

KMK03371



REAMING OUT BUSHINGS

- Shaft diameter 17 mm

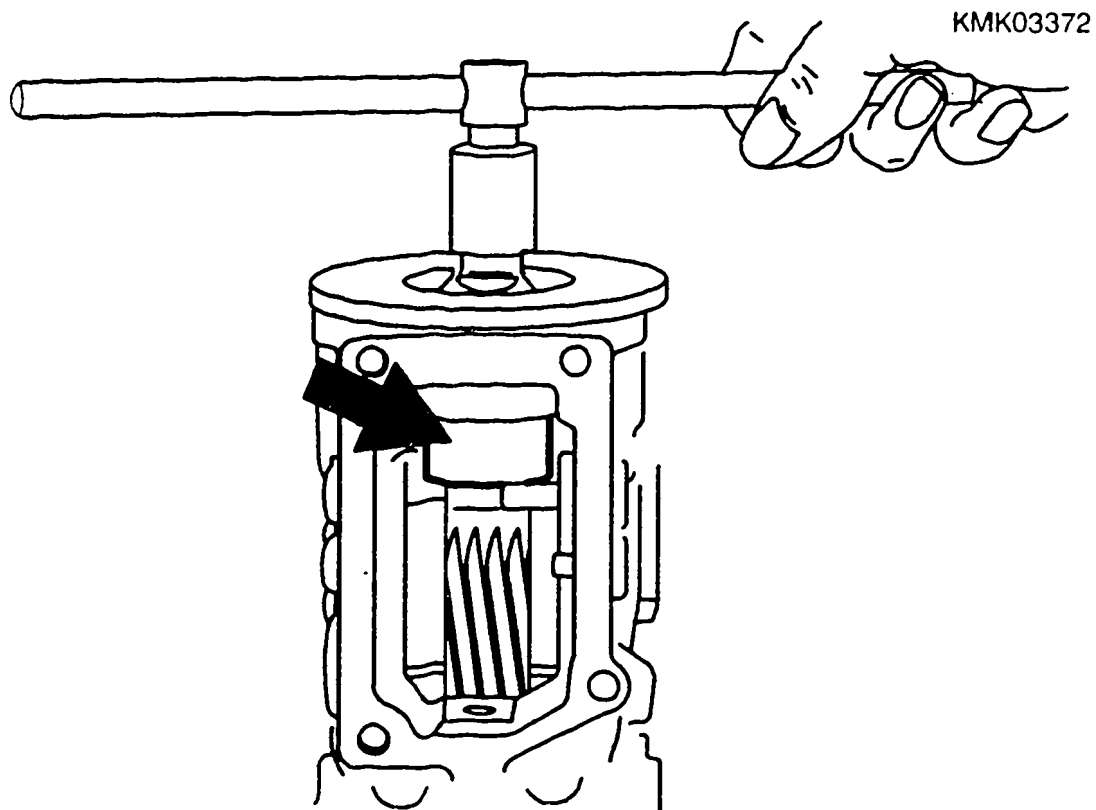
Ream out second bushing.

Ream last 2 cm without guide sleeve
(arrow).

Insert drive shaft and check for
freedom of movement.

Make repair mark.

Continue: G05/1 Fig.: F24/2



PRESSING OUT 1-PIECE BUSHING

Tool set KDEP 1171 for drive shaft
diameter 20.0 mm comprising:

- * Drill bush KDEP 1882
- * Pressing-out mandrel KDEP 1171/1
- * Pressing-in mandrel KDEP 1171/2
- * Pressing-in mandrel KDEP 1171/3
- * Guide sleeve KDEP 1171/4
- * Hand reamer KDEP 1171/5
- * Drill 7.6 mm commercially available

Note:

Use support KDEP 1170/6 to guide
pressing-in mandrel KDEP 1171/2 and
hand reamer.

Continue: F26/1

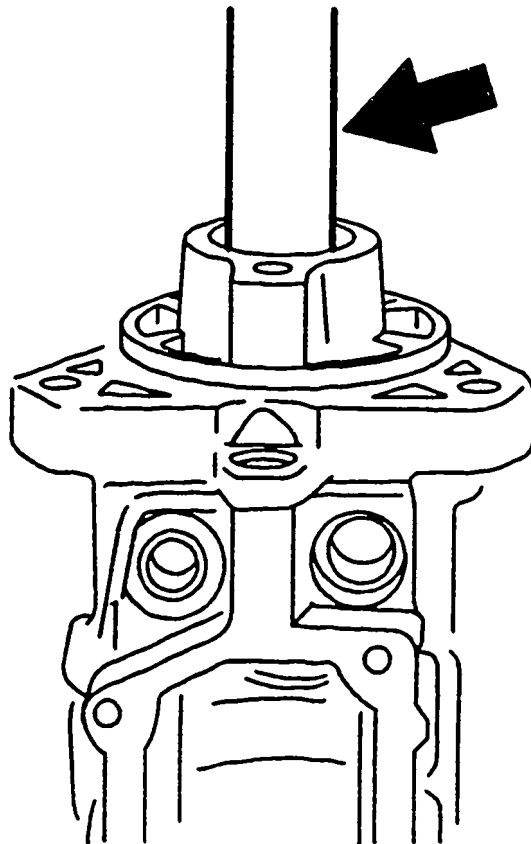
REPLACING BUSHING OF DRIVE SHAFT

Arrow = Pressing-out mandrel

Position injection-pump housing with support KDEP 1170/6 flat on support plate on mandrel press. Remove any burr on pump housing (end face of distributor head).

Press out bushing on drive end with pressing-out mandrel KDEP 1171/1. Wash out VE housing; there must not be any grease in hole.

Continue: F27/1 Fig.: F26/2

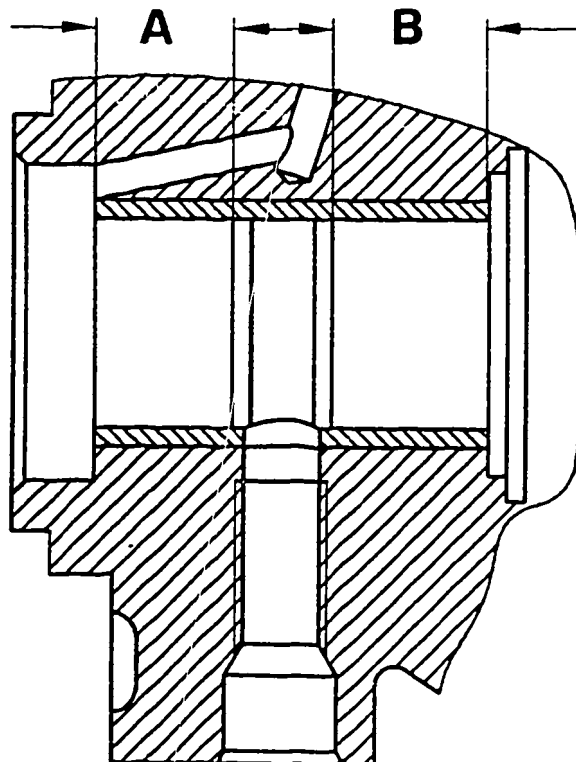


KMK03364

REPLACING BUSHING OF DRIVE SHAFT

Before installing 1-piece bushing,
measure bearing surfaces "A" and "B".
The long side must face the interior
of the pump on pressing in.

Continue: F28/1 Fig.: F27/2



KMK03373

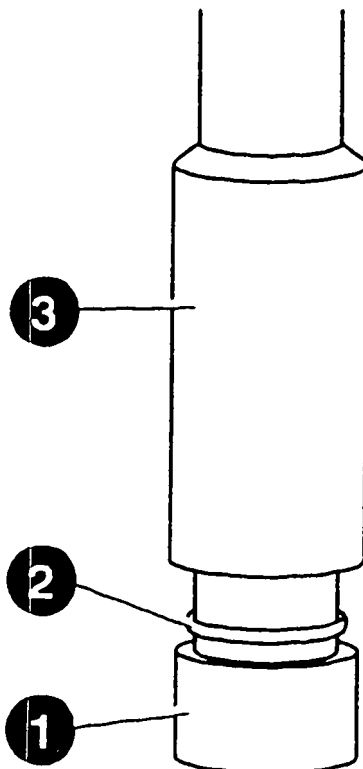
PRESSING IN BUSHING

- 1 = Bushing
- 2 = O-ring
- 3 = Pressing-in mandrel

Position pump housing flat on support plate of mandrel press on drive end. Slip bushing with long bearing surface over O-ring of pressing-in mandrel.

Continue: G01/1 Fig.: F28/2

KMK03365



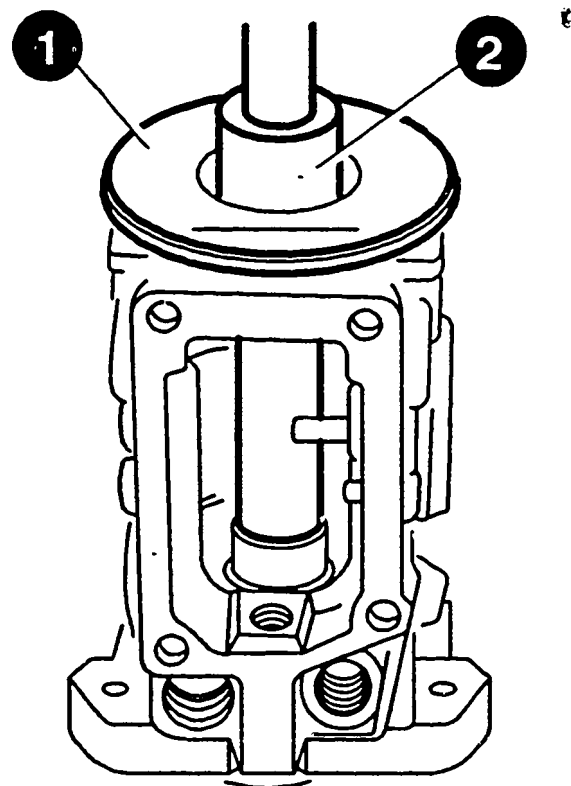
PRESSING IN BUSHING

1 = Support ring

2 = Guide sleeve

Apply Loctite 582 to O.D. of bushing.
Insert support ring into pump housing.
Press bushing flat and flush into pump
housing until it makes contact.

Continue: G02/1 Fig.: G01/2



KMK03366

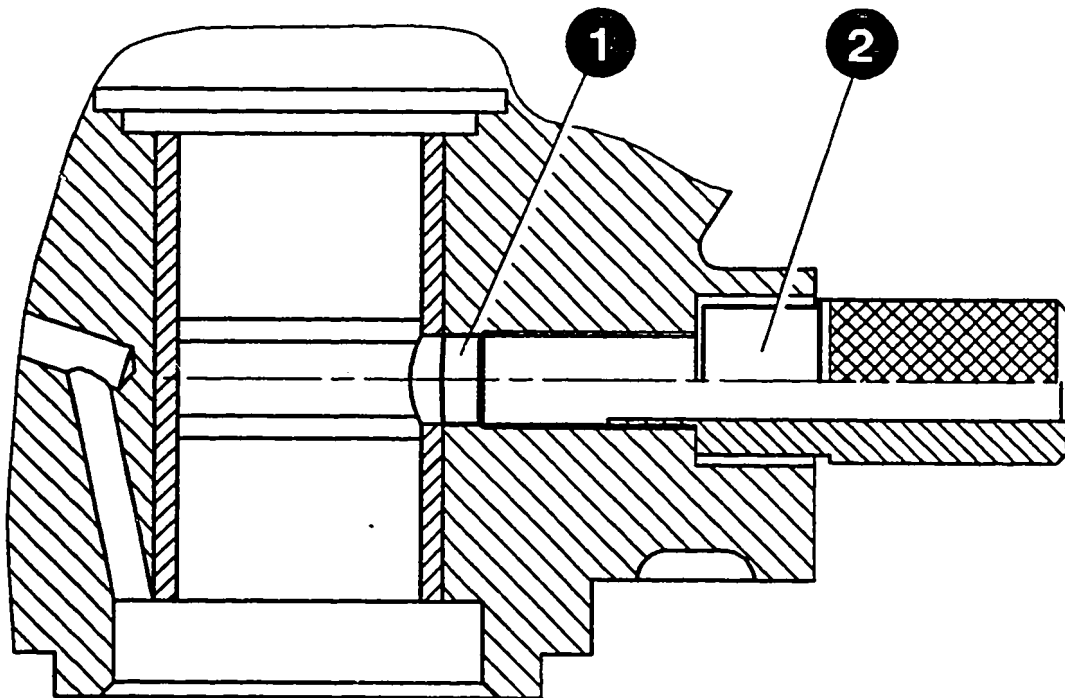
DRILLING OUT BUSHING

- 1 = Hole, locked timing
- 2 = Drill bushing

Drill out bushing on pumps with tapped hole on side for locked timing.
To do so, screw drill bushing KDEP 1882 into tapped hole.
Drill through bushing with 7.6 mm diameter bit.

Continue: G03/1 Fig.: G02/2

KMK03374



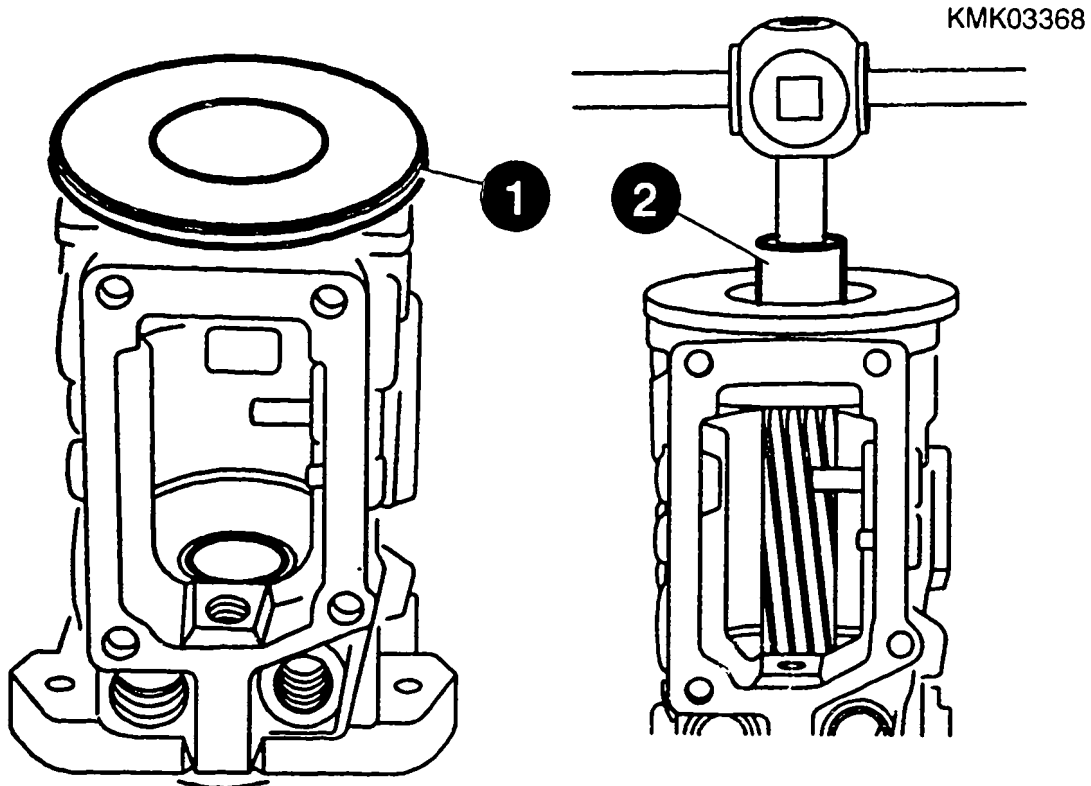
REAMING OUT BUSHINGS

- 1 = Support ring
- 2 = Guide sleeve

Place injection-pump housing flat on support plate on drive end. Insert support ring in pump housing.

Insert hand reamer in support ring. Insert guide sleeve KDEP 1171/4 in support ring (shouldered collar faces upwards).

Continue: G04/1 Fig.: G03/2



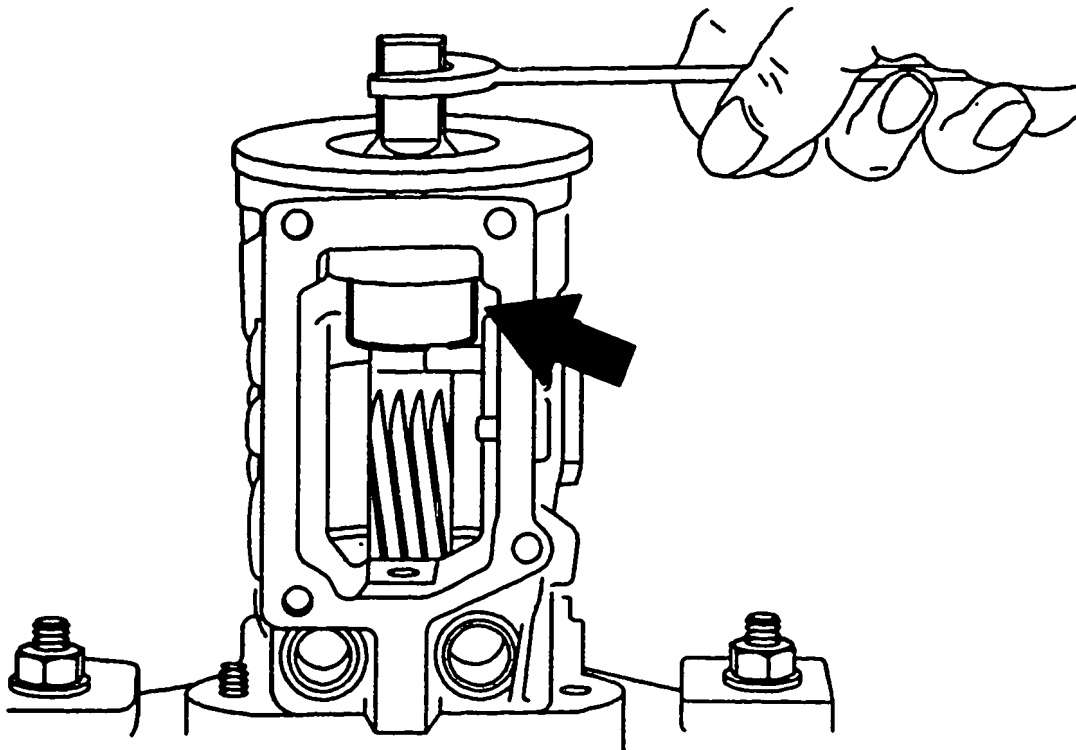
REAMING OUT BUSHINGS

Place wrench on reamer and ream out bushing with oil.
Turn guide sleeve (shouldered collar diameter faces pump housing - arrow).

Ream out second bushing.
Ream last 2 cm with guide sleeve and open ended wrench.
Insert drive shaft and check for freedom of movement.
Make repair mark.

Continue: G05/1 Fig.: G04/2

KMK03369



**ASSEMBLING DISTRIBUTOR-TYPE
FUEL INJECTION PUMP**

*** Pressing in radial-lip-type oil seal**

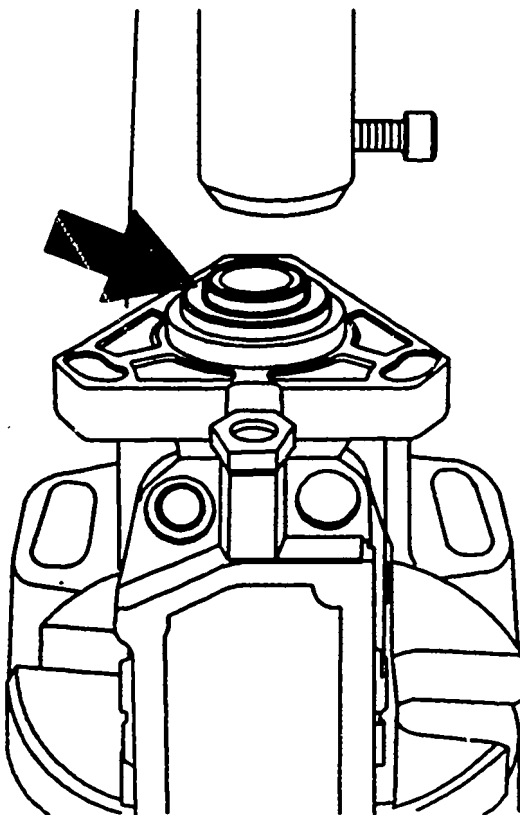
A clean workplace is required for assembly.

Apply calibrating oil to all moving parts, seal rings and O-rings prior to assembly.

Tighten all screws to prescribed tightening torque. Press radial-lip-type oil seal (arrow) into housing with mandrel press.

Attach distributor-type fuel-injection-pump housing with appropriate flange and support clamp KDEP 2919 and swivel downwards.

Continue: G06/1 Fig.: G05/2



KMK03375

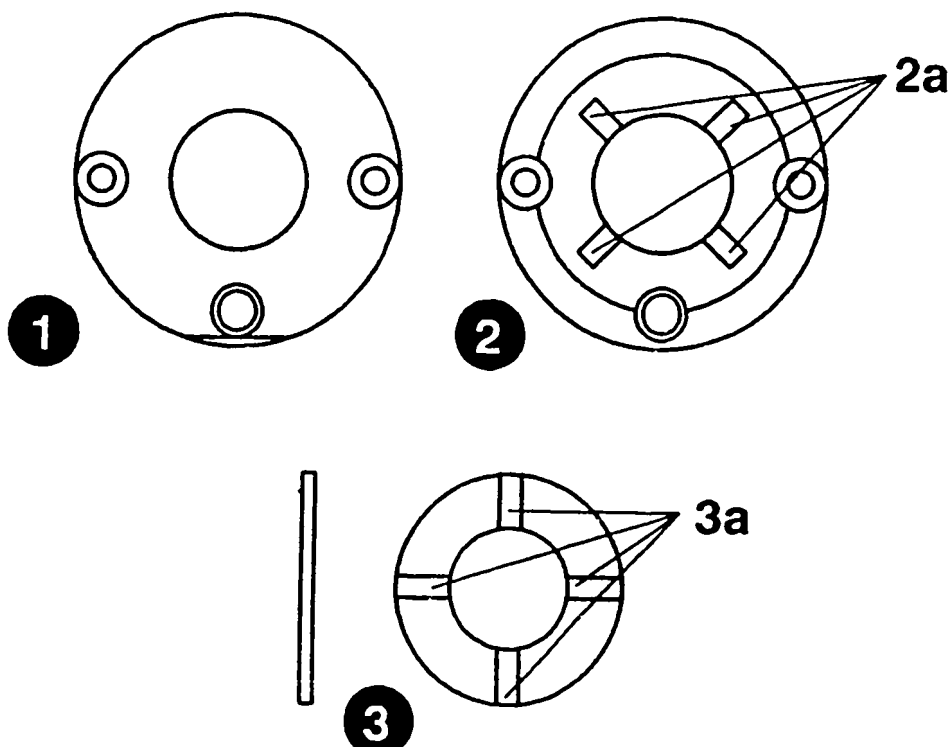
ASSEMBLING VANE-TYPE SUPPLY PUMP

- 1 = Old support ring
- 2 = New support ring
- 2a = Grooves (new)
- 3 = Old slotted washer
- 3a = Grooves (no longer applicable)

As of FD 349 (date of manufacture), distributor-type fuel-injection pumps were modified in terms of slotted washer and support ring such that there are no longer any grooves in the slotted washer and such that there are grooves in the support ring instead (see picture).

Continue: G07/1 Fig.: G06/2

KMK03376



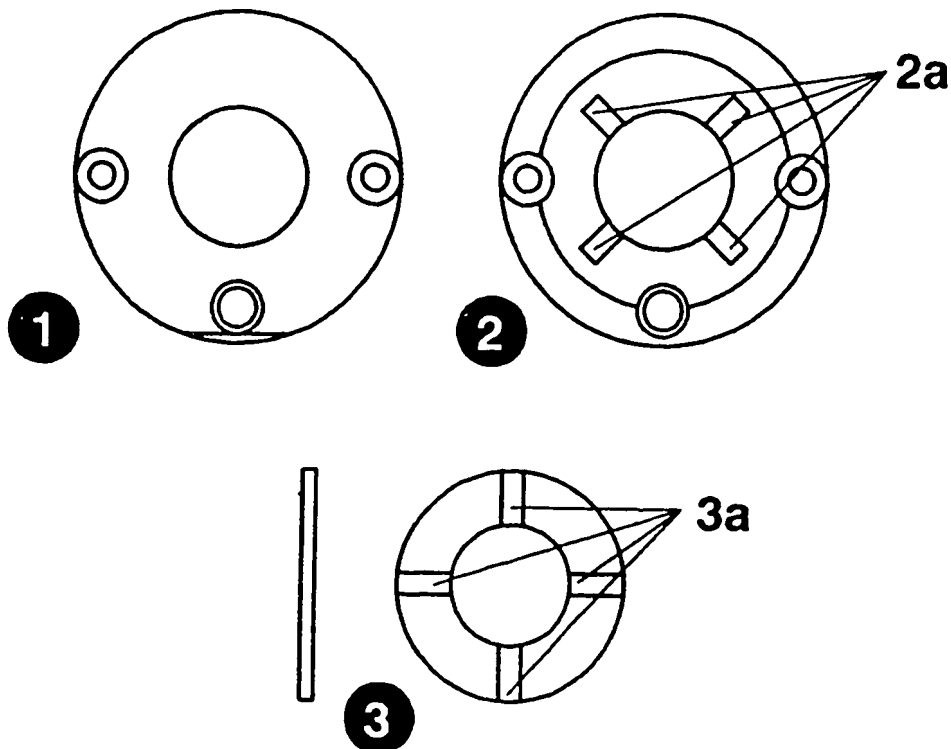
ASSEMBLING VANE-TYPE PUMP

- 1 = Old support ring
- 2 = New support ring
- 2a = Grooves (new)
- 3 = Old slotted washer
- 3a = Grooves (no longer applicable)

Assembly of the support ring with grooves (new) with a slotted washer with grooves (old) is possible, however not assembly of a support ring with no grooves (old) with a slotted washer with no grooves (new).

Continue: G08/1 Fig.: G07/2

KMK03376



ASSEMBLING VANE-TYPE SUPPLY PUMP

1 = Holding ring

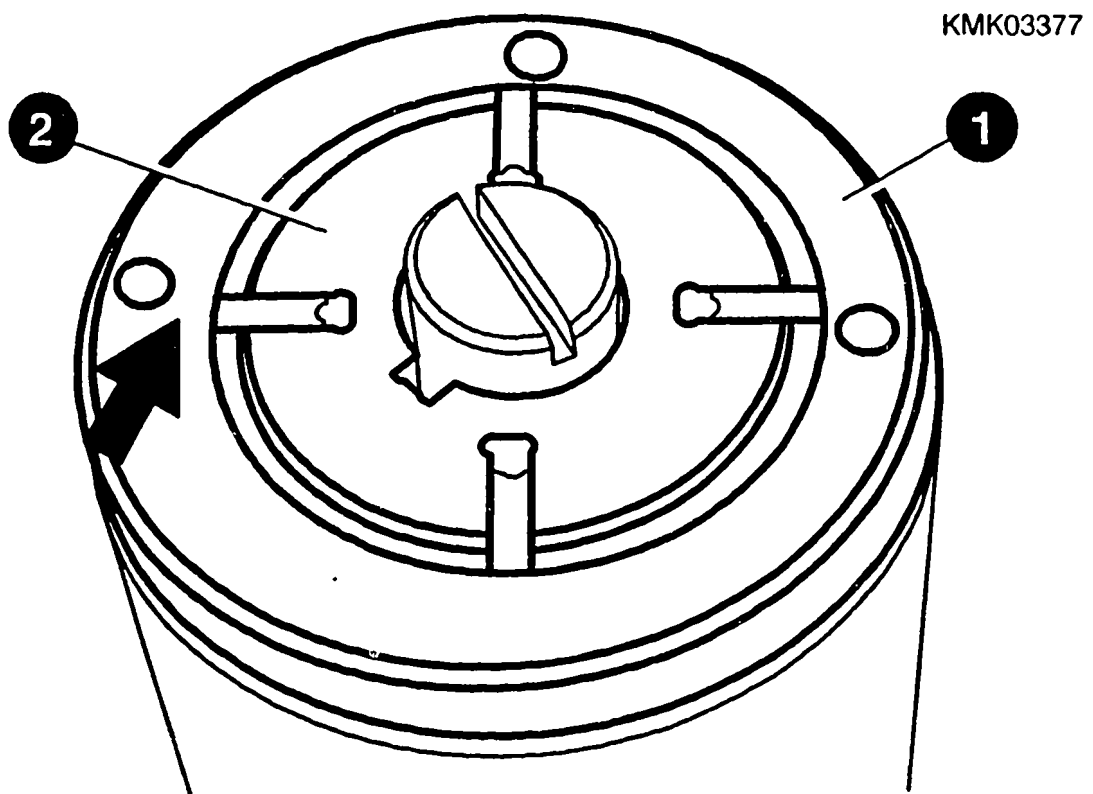
2 = Slotted washer with pump vane

Position support ring with slotted washer and pump vane on assembly tool KDEP 1097 with holding mandrel.

Insert pump vane such that crowned surface faces outwards (arrow).

Place holding ring (eccentric ring) on supporting plate.

Continue: G09/1 Fig.: G08/2

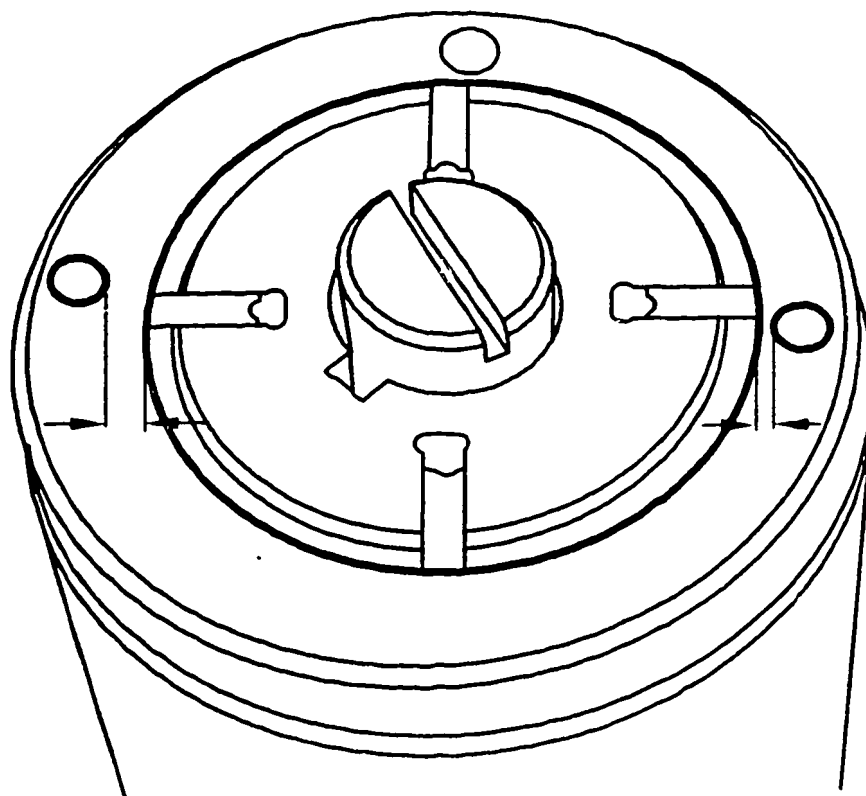


ASSEMBLING VANE-TYPE SUPPLY PUMP

The two opposing holes in the holding ring are a different distance from the bearing surface of the pump vanes. As characteristic feature of the installation of the holding ring, attention is to be paid to the hole further away from the bearing surface.

Continue: G10/1 Fig.: G09/2

KMK03378

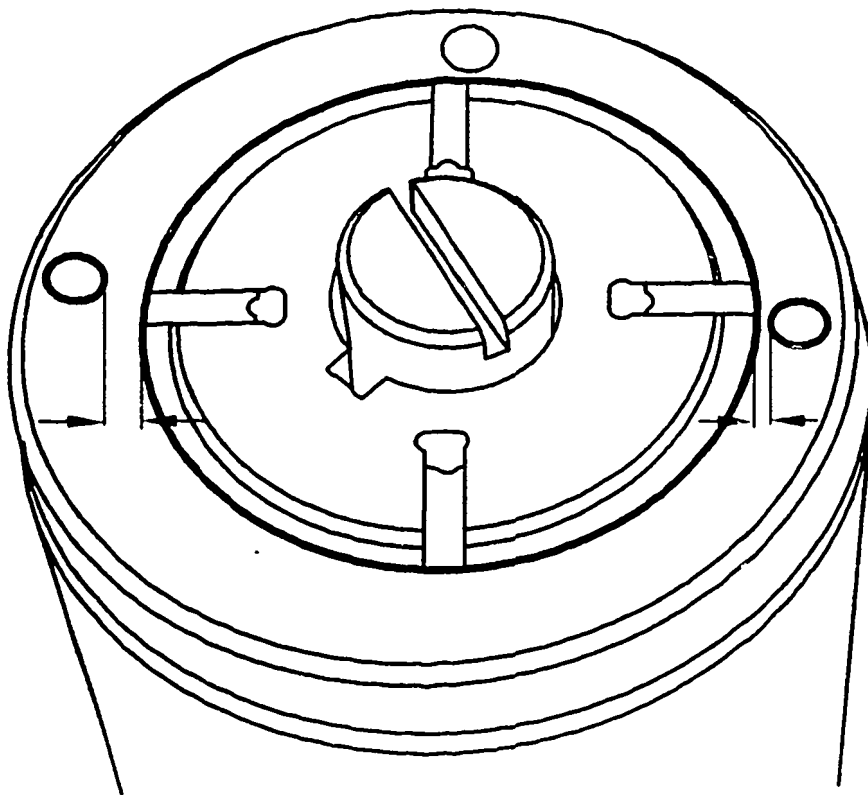


ASSEMBLING VANE-TYPE SUPPLY PUMP

If the direction of rotation of the fuel-injection pump is given as "L", this hole must be on the left when looking towards the assembly tool and on the right if "R" is given as direction of rotation.

Continue: G11/1 Fig.: G10/2

KMK03378

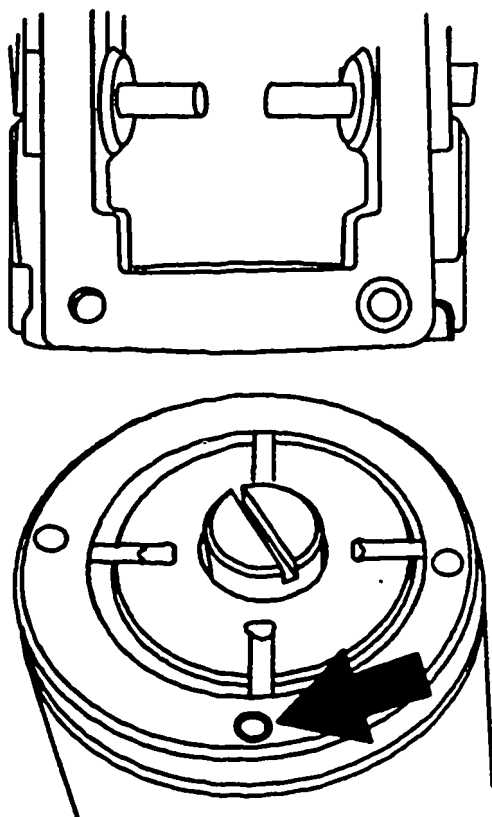


ASSEMBLING VANE-TYPE SUPPLY PUMP

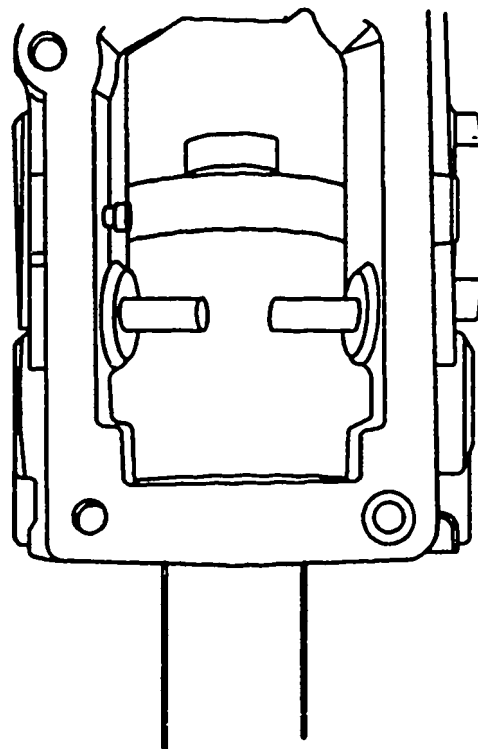
The center hole (arrow) must always face upwards towards the governor in the pump housing.

Insert supply pump with assembly tool KDEP 1097 from underneath into pump housing. Leave assembly tool in position.

Continue: G12/1 Fig.: G11/2



KMK03379



ASSEMBLING VANE-TYPE SUPPLY PUMP

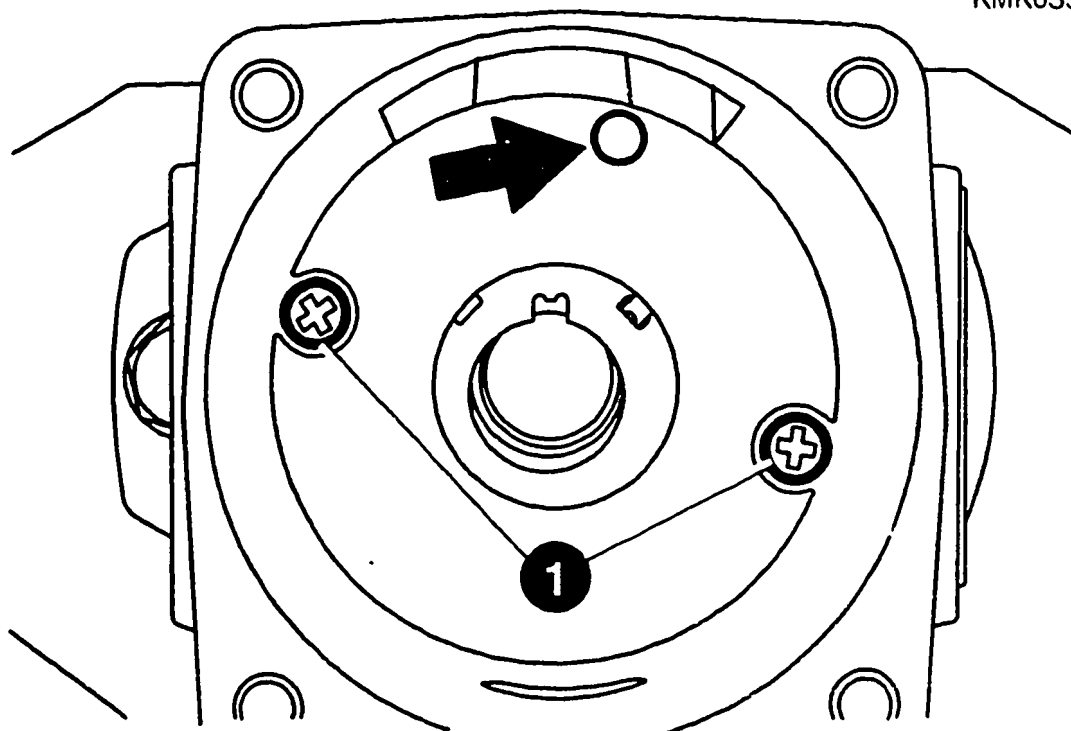
1 = Countersunk screws

Swivel pump housing upwards through 180° and pull out assembly tool.

Before securing support ring with countersunk screws, check whether all three holes coincide with the eccentric ring and whether the center hole (arrow) is pointing upwards towards the governor.

Continue: G13/1 Fig.: G12/2

KMK03380



INSTALLING DRIVE SHAFT

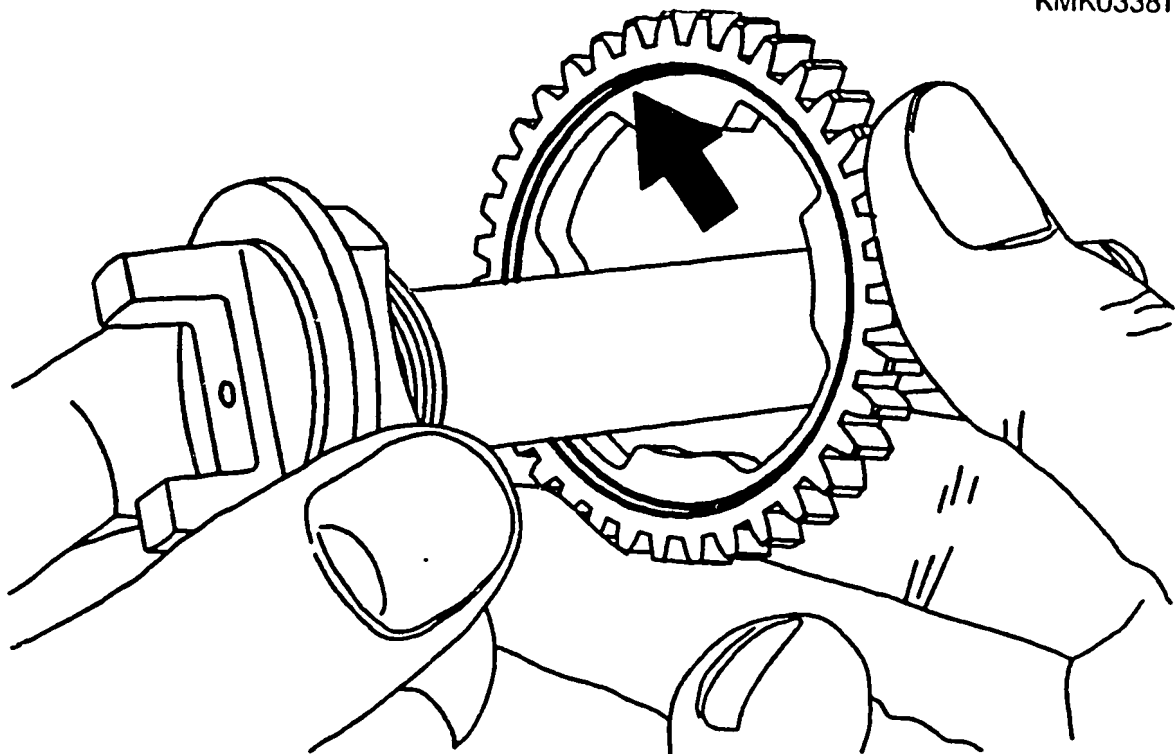
Slip gear wheel onto drive shaft such that recess in gear wheel points towards claws of drive shaft (arrow). Press new rubber buffers by hand into gear wheel.

Stick slotted washer to drive shaft with grease.

Insert Woodruff key in drive shaft.

Continue: G14/1 Fig.: G13/2

KMK03381



ASSEMBLING DRIVE SHAFT; INSERTING STEEL RINGS AND SHAFT IN PUMP HOUSING

Position pump housing such that it is horizontal.

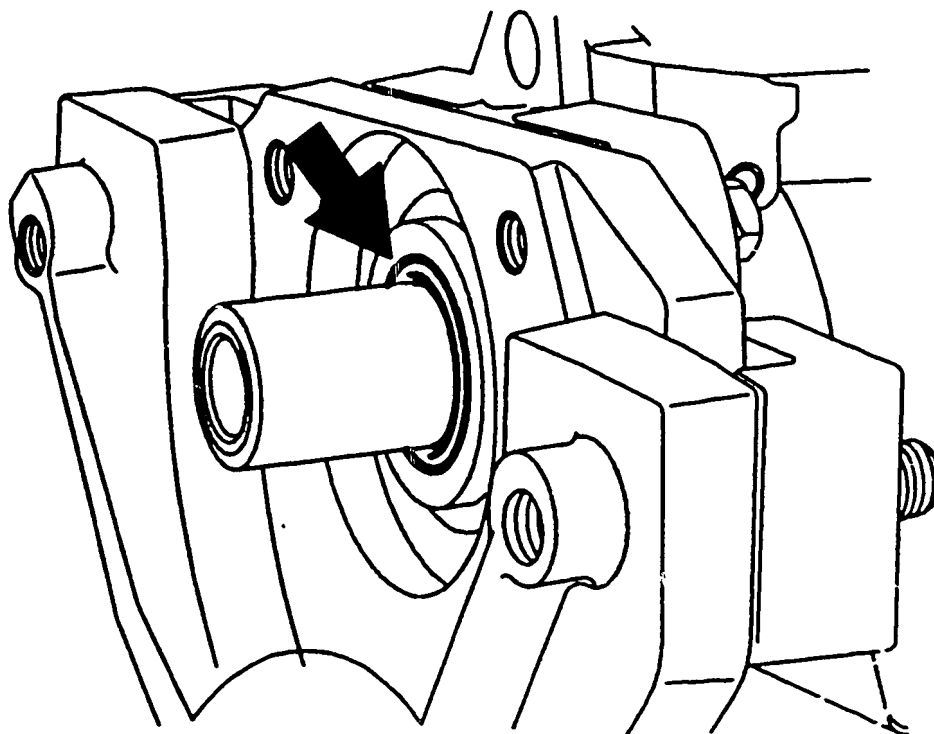
Attach assembly sleeve to protect radial-lip-type oil seal.

Insert preassembled drive shaft into pump housing such that Woodruff key engages in groove of impeller.

Position pump housing such that it is perpendicular.

Continue: G15/1 Fig.: G14/2

KMK03382



INSERTING CAM ROLLER RING IN PUMP HOUSING

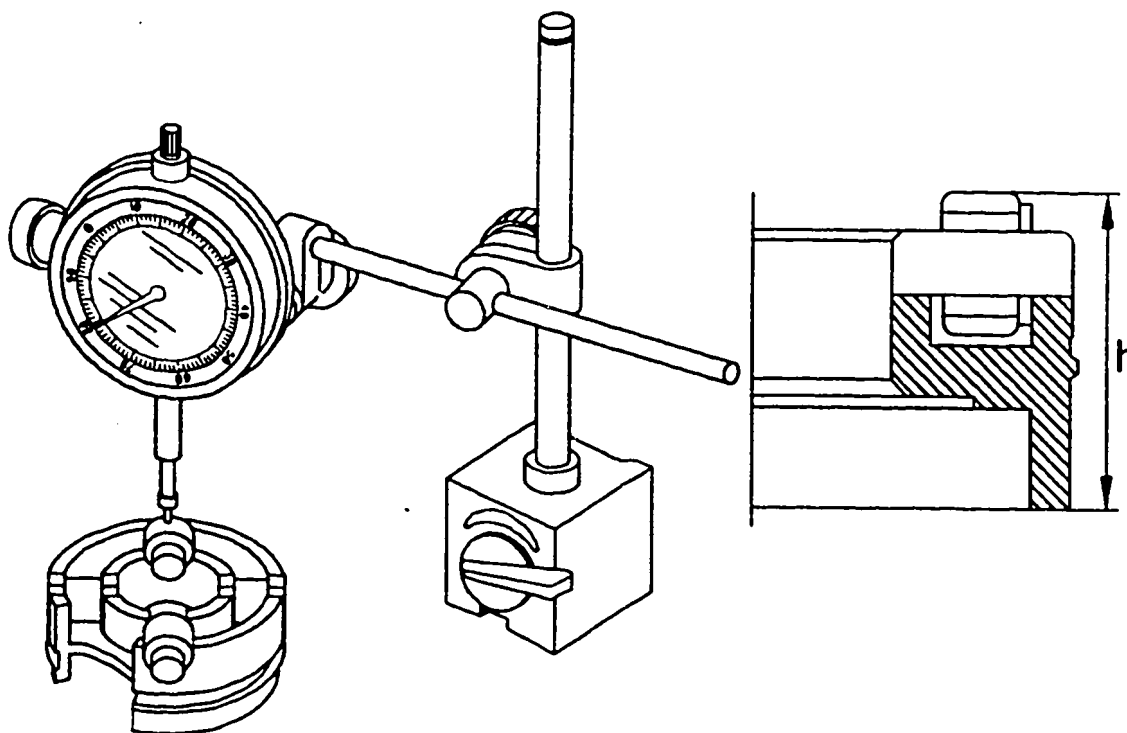
Rollers of cam roller ring must not drop out or be mixed up.

If this is the case, the roller height must be re-measured.

Maximum difference between the individual roller heights 0.02 mm.

Continue: G16/1 Fig.: G15/2

KMK03383



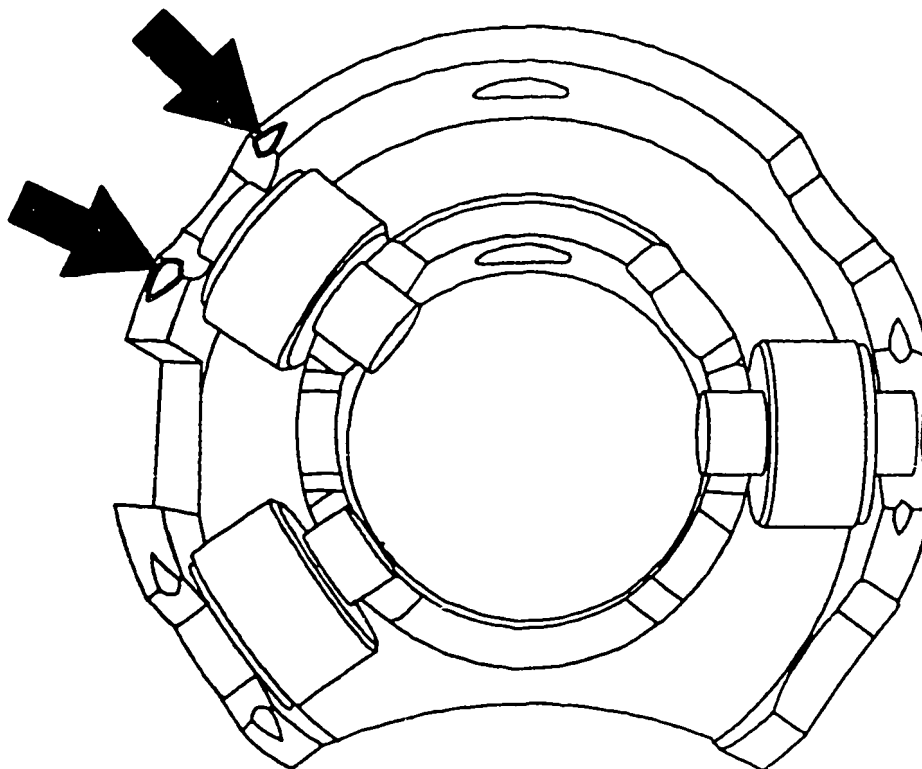
INSERTING CAM ROLLER RING IN PUMP HOUSING

Attention is to be paid to the installation of the rollers in the case of cam roller rings with 3 rollers. The bearing grooves into which one roller is to be inserted in each case are marked by way of notches (arrows) on the end face of the cam roller ring.

The other bearing grooves are not used.

Continue: G17/1 Fig.: G16/2

KMK03384



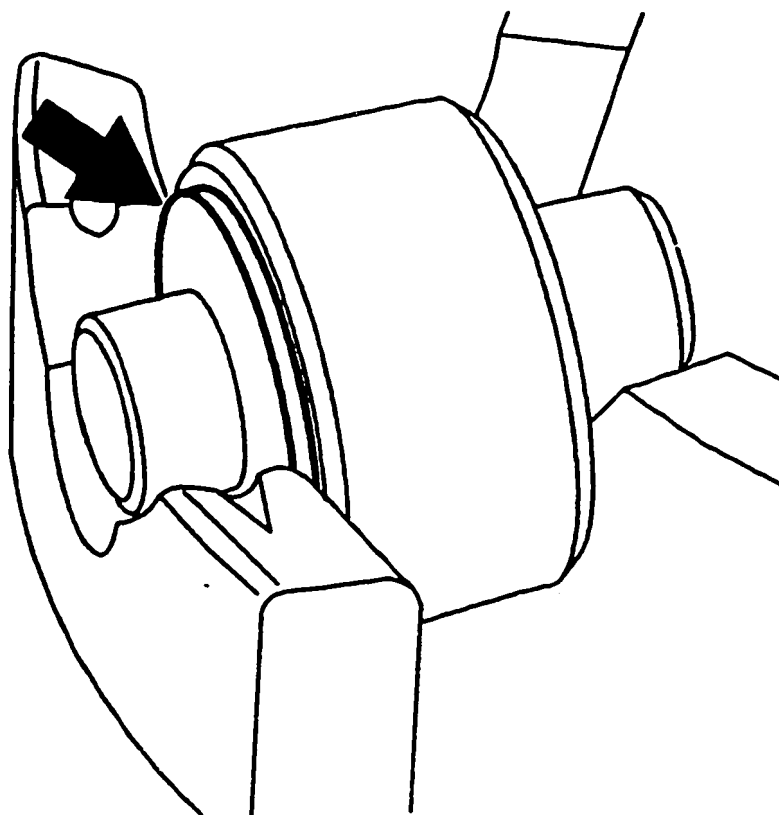
INSERTING CAM ROLLER RING IN PUMP HOUSING

NOTE:

When fitting rollers, make sure that
spring seats are installed on outside
of rollers (arrow).

The tapered side must point towards
the outer ring.

Continue: G18/1 Fig.: G17/2



KMK03385

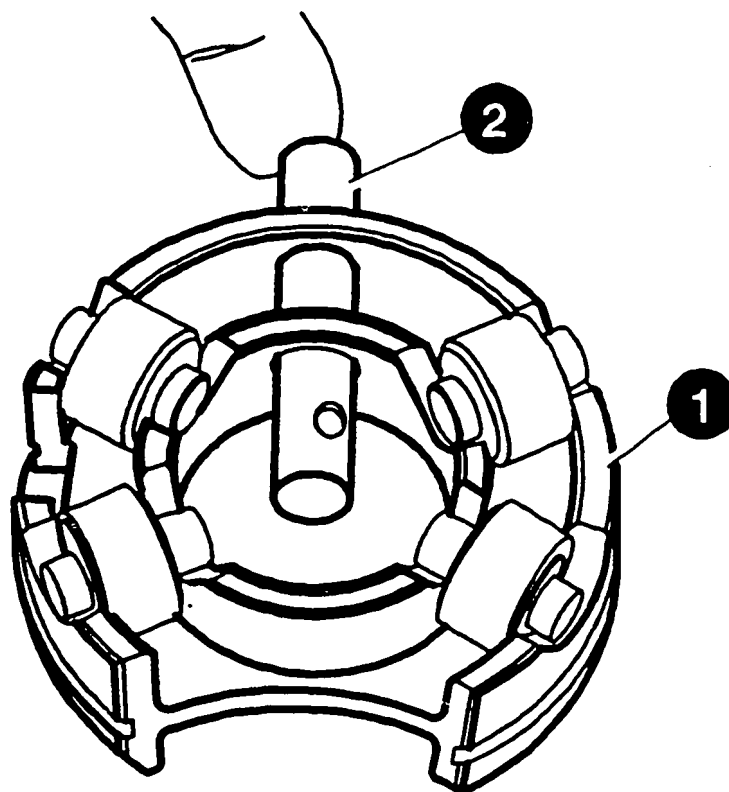
INSERTING CAM ROLLER RING IN PUMP HOUSING

- 1 = Cam roller ring
- 2 = Sliding bolt

Push sliding bolt completely into cam roller ring cross-bore first. Position cross-bore such that it is vertical.

Position claws of drive shaft in parallel with timing device.

Continue: G19/1 Fig.: G18/2



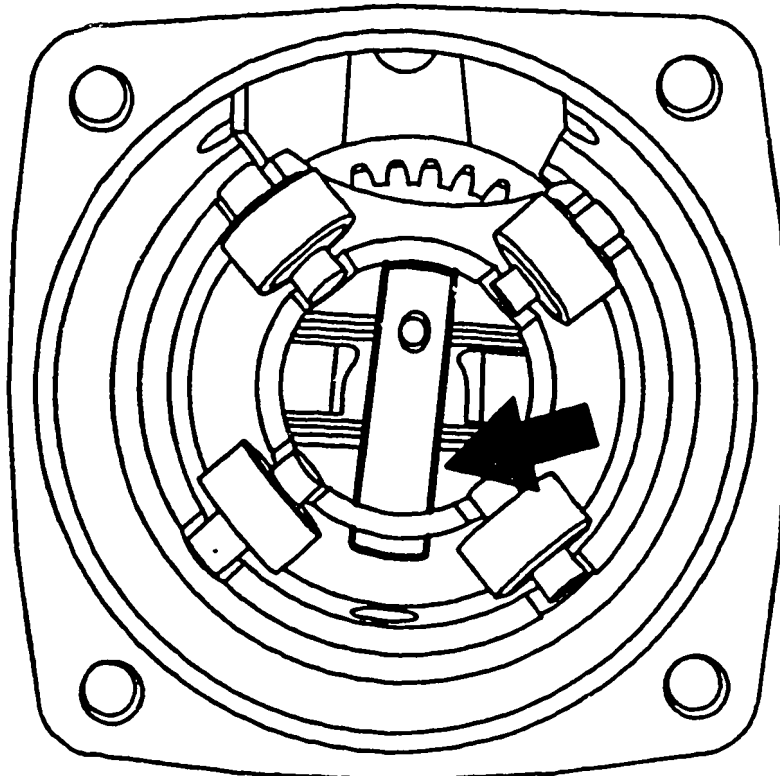
KMK03386

INSERTING CAM ROLLER RING IN PUMP HOUSING

Insert cam roller ring in pump housing
such that sliding bolt (arrow) faces
timing device.

Continue: G20/1 Fig.: G19/2

KMK03387

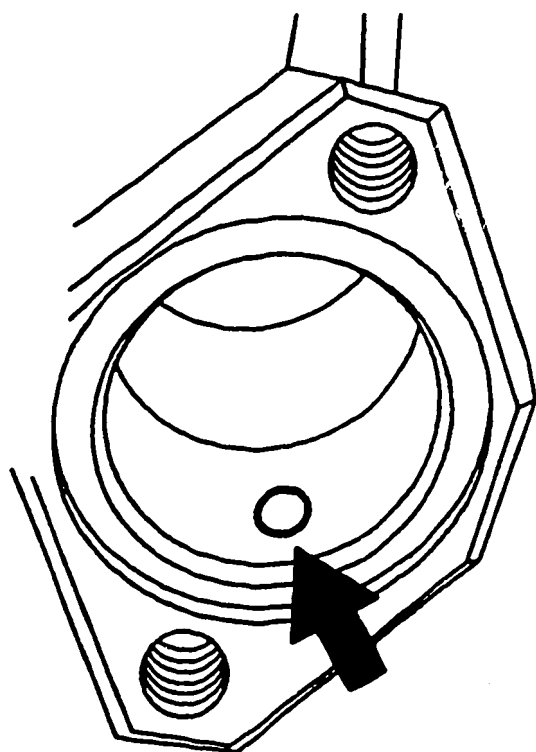


INSERTING TIMING-DEVICE PISTON

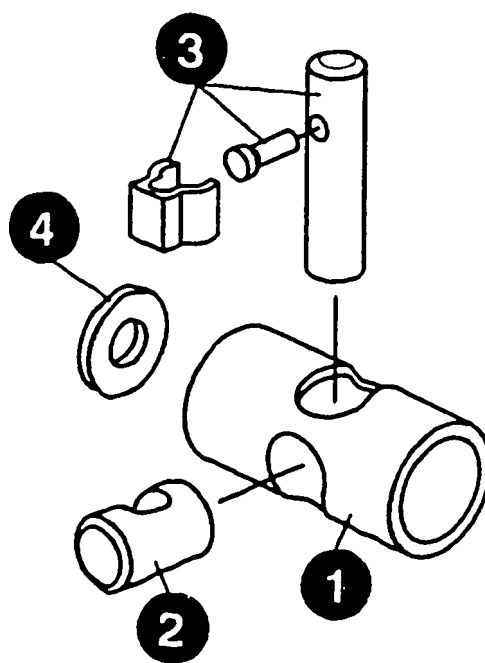
- 1 = Timing-device piston
- 2 = Sliding piece
- 3 = Sliding bolt with retaining pin and retaining bracket
- 4 = Shim

Insert sliding piece and shim in timing-device piston with grease. Slip timing-device piston into pump housing such that open side for compression spring faces return bore (arrow).

Continue: G21/1 Fig.: G20/2



a



b

KMK03388

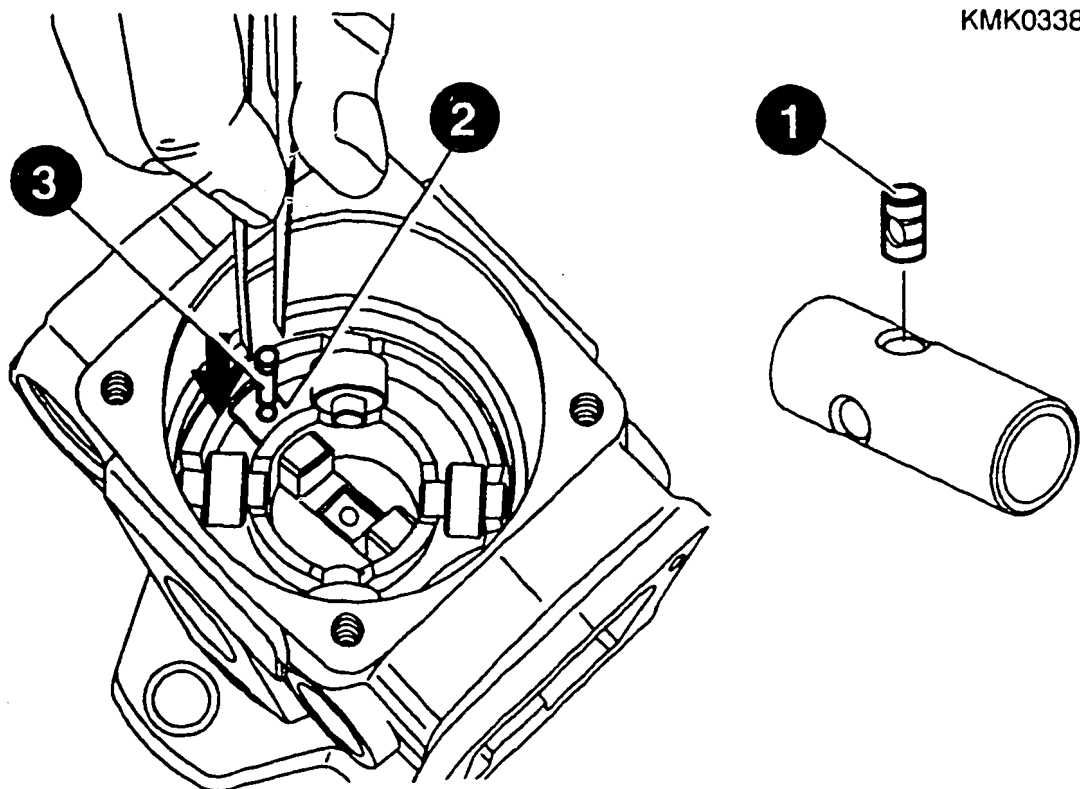
INSERTING TIMING-DEVICE PISTON

- 1 = Sliding piece
- 2 = Sliding bolt
- 3 = Retaining pin

The hole in the sliding piece faces the cam roller ring.

Insert sliding bolt into sliding piece of timing-device piston and secure with retaining pin.

Continue: G22/1 Fig.: G21/2



INSERTING TIMING-DEVICE PISTON

1 = Retaining bracket

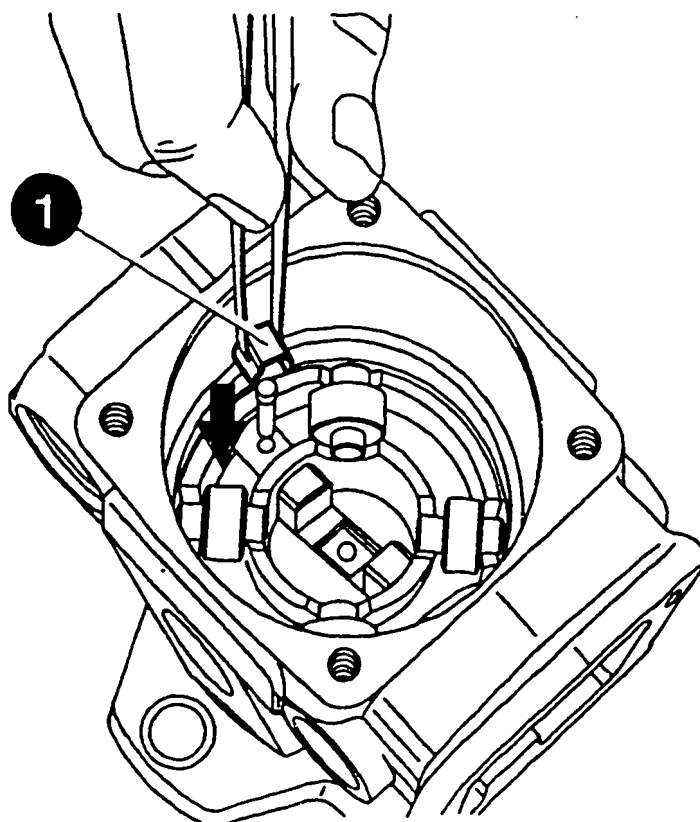
Attach retaining bracket to retaining pin. Check freedom of movement of timing device!

Install timing-device cover with seal ring.

Note:

The timing-device travel is determined by the length of the piston and does not have to be calibrated.

Continue: G23/1 Fig.: G22/2



KMK03390

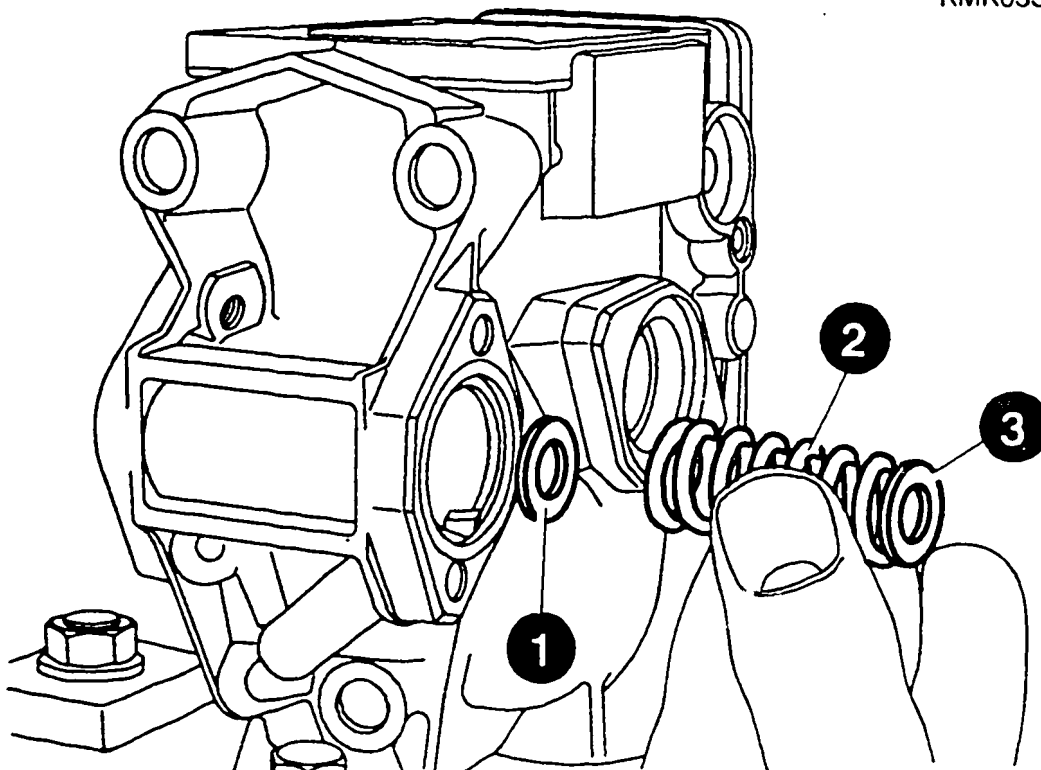
CHECKING AND ADJUSTING TIMING-DEVICE SHIM THICKNESS "SVS"

- 1 = Shim
- 2 = Compression spring
- 3 = Shim

Measure thickness of shims (comprising items 1 and 3). Allowance must always be made for the shim plate in the timing-device piston. Compare to data given in corresponding test-specification sheet under "SVS". Add or remove shims if necessary.

Continue: G24/1 Fig.: G23/2

KMK03391



CHECKING AND ADJUSTING TIMING-DEVICE SHIM THICKNESS "SVS"

Insert approx. 0.6 mm thick shim in timing-device piston. Install compression spring; insert seal ring and fit closing cover with remaining shims of dimension "SVS".

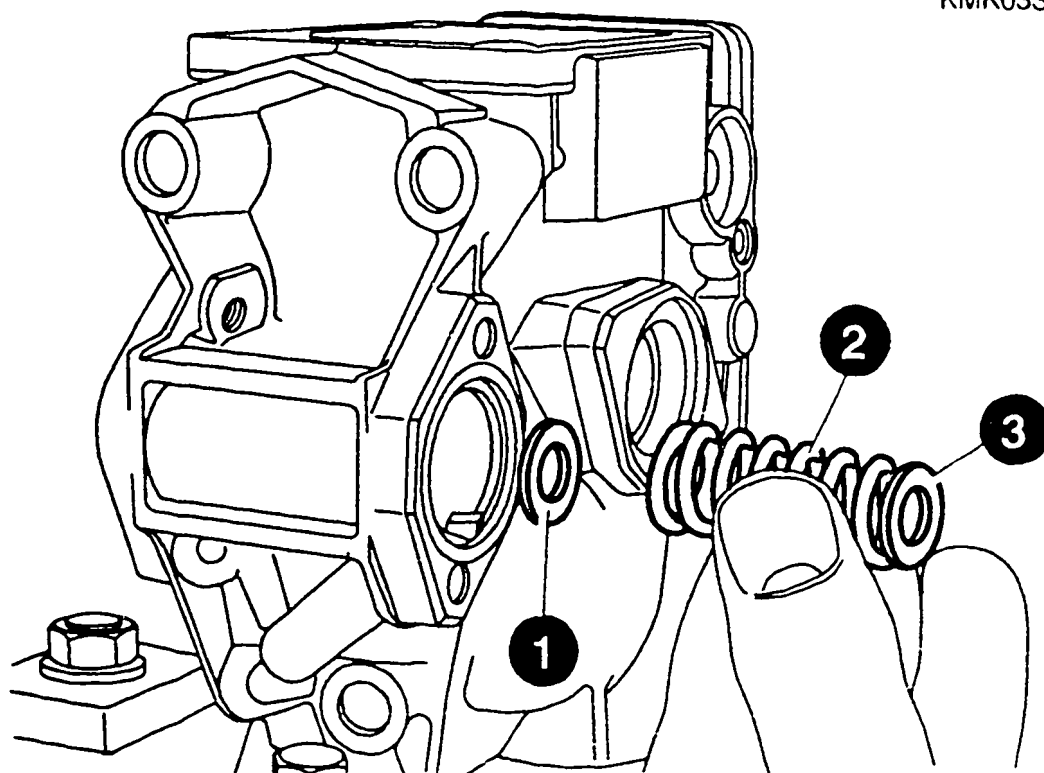
Note:

There must be at least one shim on either side of the compression spring (max. 3 mm thick).

"SVS" is the maximum dimension.

Continue: G25/1 Fig.: G24/2

KMK03391



INSTALLING COLD START ACCELERATION
DEVICE KSB

Select further assembly in line with
following add-on modules:

- * Attaching mechanical cold start
acceleration device (KSB)
Version with no detent position G26/1
- * Version with detent position H06/1
- * Attaching hydraulic KSB H09/1
- * Attaching temperature-controlled
KSB H11/1
- * Pump with no KSB H17/1

Continue: G26/1

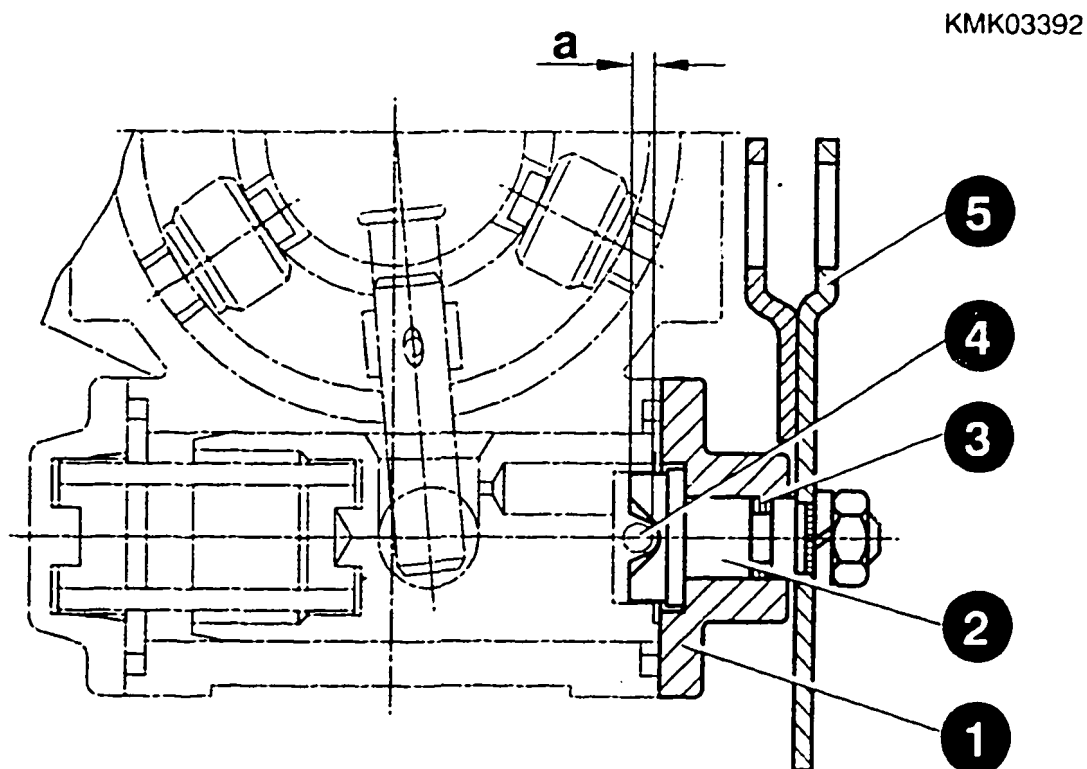
ATTACHING MECHANICAL COLD START ACCELERATION DEVICE (KSB)

- a = Function stroke
- 1 = Closing cover
- 2 = Shaft
- 3 = O-ring
- 4 = 4 mm pin at timing-device piston
- 5 = Stop lever

If applicable, fit KSB on delivery end
of timing device.

Install shaft with O-ring in closing
cover.

Continue: G27/1 Fig.: G26/2



ATTACHING MECHANICAL COLD START
ACCELERATION DEVICE (KSB)

1 = Stop plate

Attach closing cover to pump housing
(timing device) with stop plate
depending on version.

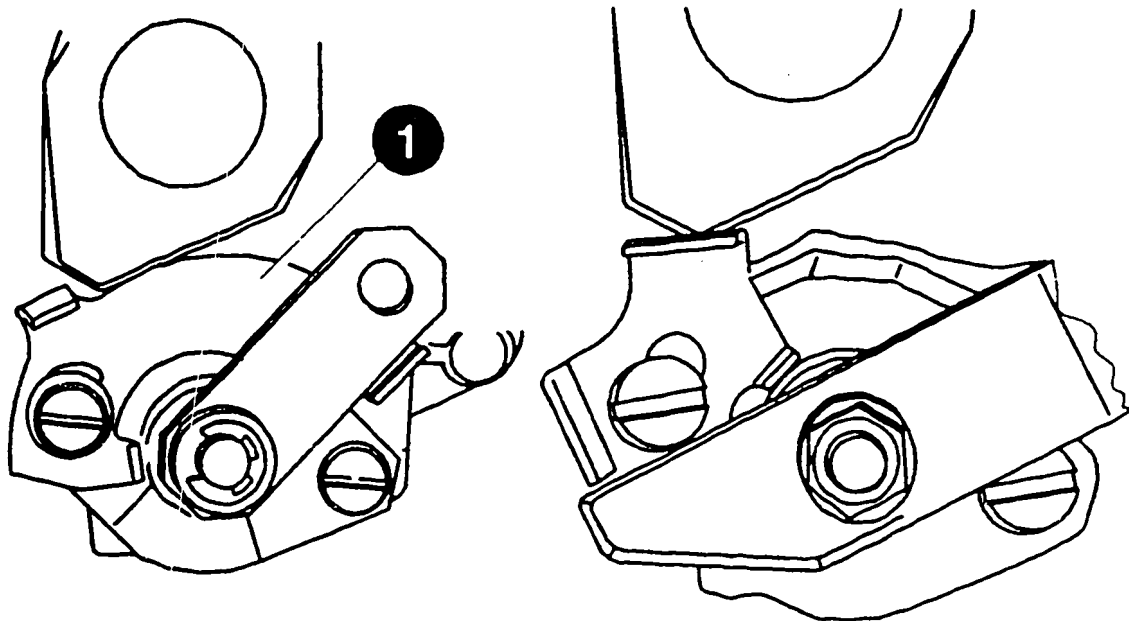
Picture, left : Version 1

Picture, right: Version 2

Perform basic setting of stop lever.

Continue: G28/1 Fig.: G27/2

KMK03393



BASIC SETTING OF STOP LEVER

* Version 1

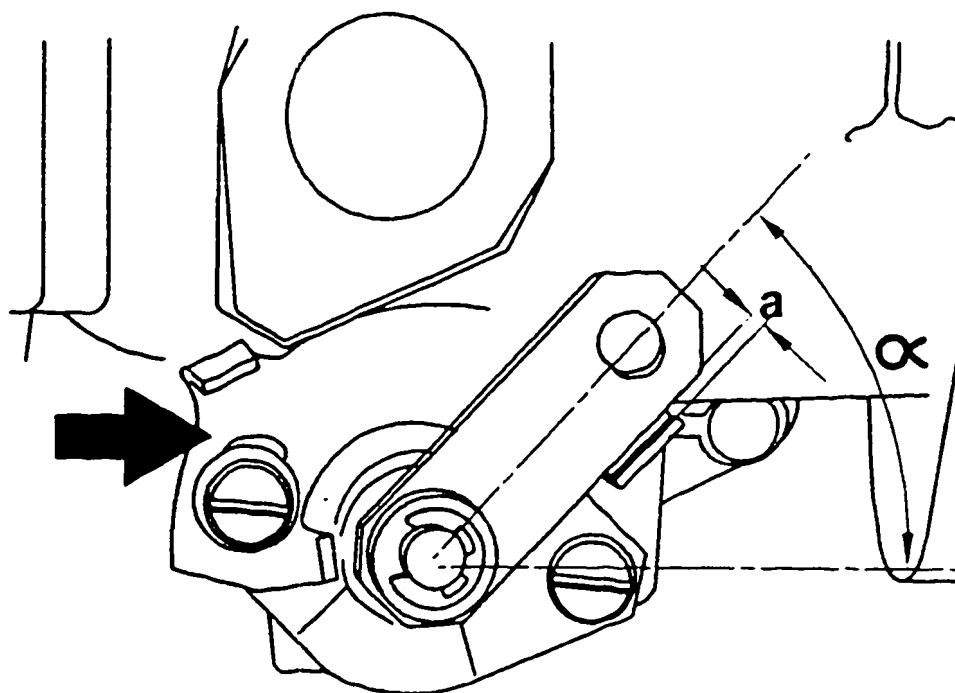
Turn KSB shaft by hand in adjustment direction until cam makes noticeable contact with 4 mm pin of timing-device piston.

Install stop lever at angle alpha in correct position in adjustment direction. Angle is given in test-specification sheet.

Adjust stop plate in this lever position to 1 mm clearance (a).

Continue: H01/1 Fig.: G28/2

KMK03394



BASIC SETTING OF STOP LEVER

* Version 2

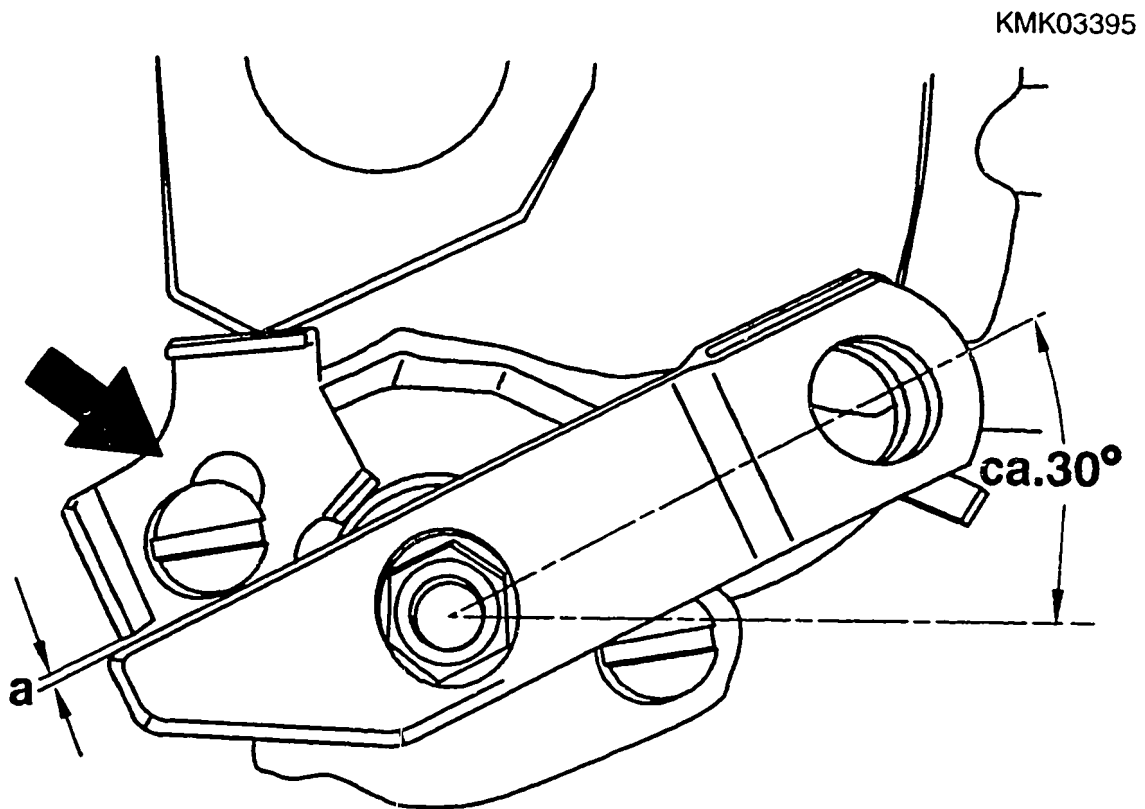
Turn KSB shaft by hand in adjustment direction until cam makes noticeable contact with 4 mm pin of timing-device piston.

Set stop plate to 1 mm clearance (a).
Position of stop lever = 30° .

Note:

Pay attention to correct installation position when fitting stop lever!

Continue: H02/1 Fig.: H01/2



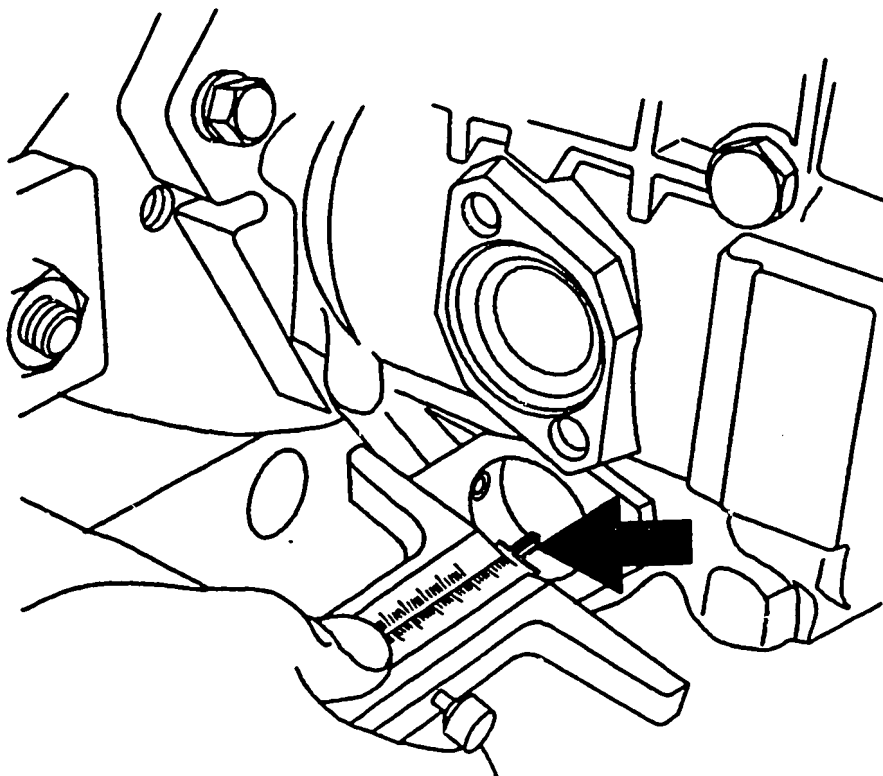
MEASURING FUNCTION STROKE

Disassemble complete cover on spring side of timing device.
Remove spring and seal ring.
Set KSB cam to UT position by turning stop lever; at the same time, press timing-device piston against cam on spring end.

Use depth gauge to measure distance between housing and timing-device piston (arrow, dimension 1).

Continue: H03/1 Fig.: H02/2

KMK03396



MEASURING FUNCTION STROKE

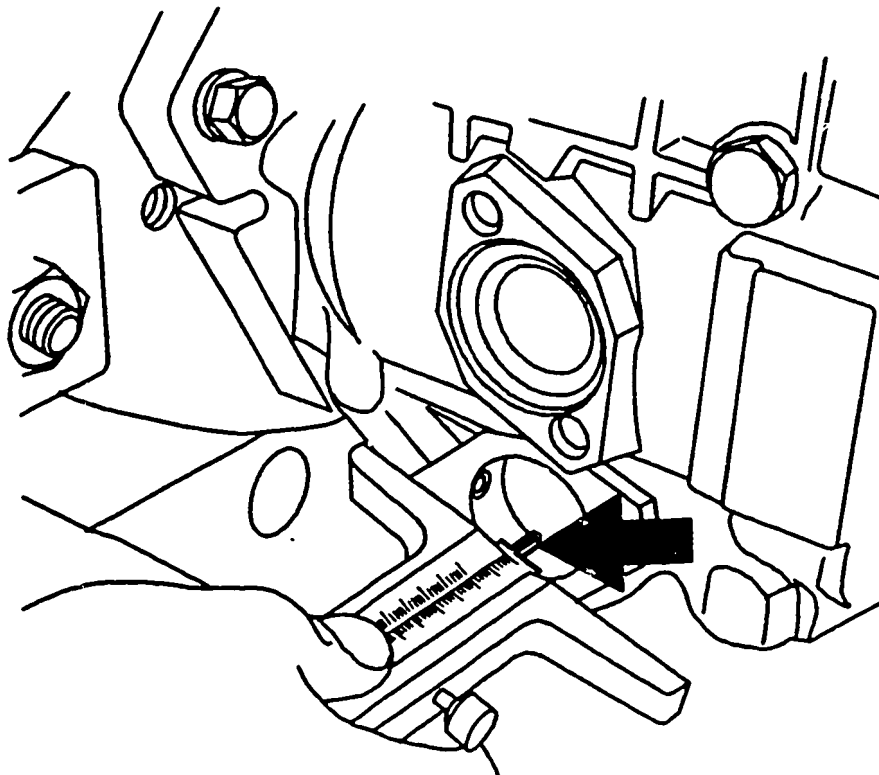
Move cam by way of stop lever to OT position; in doing so press timing-device piston against cam again.

Re-measure distance between housing and timing-device piston (arrow, dimension 2).

Difference between dimensions 1 and 2 gives function stroke (refer to test-specification sheet).

Continue: H04/1 Fig.: H03/2

KMK03396



MEASURING FUNCTION STROKE

- 1 = Timing-device spring
- 2 = Seal ring
- 3 = Timing-device cover
- 4 = Pin

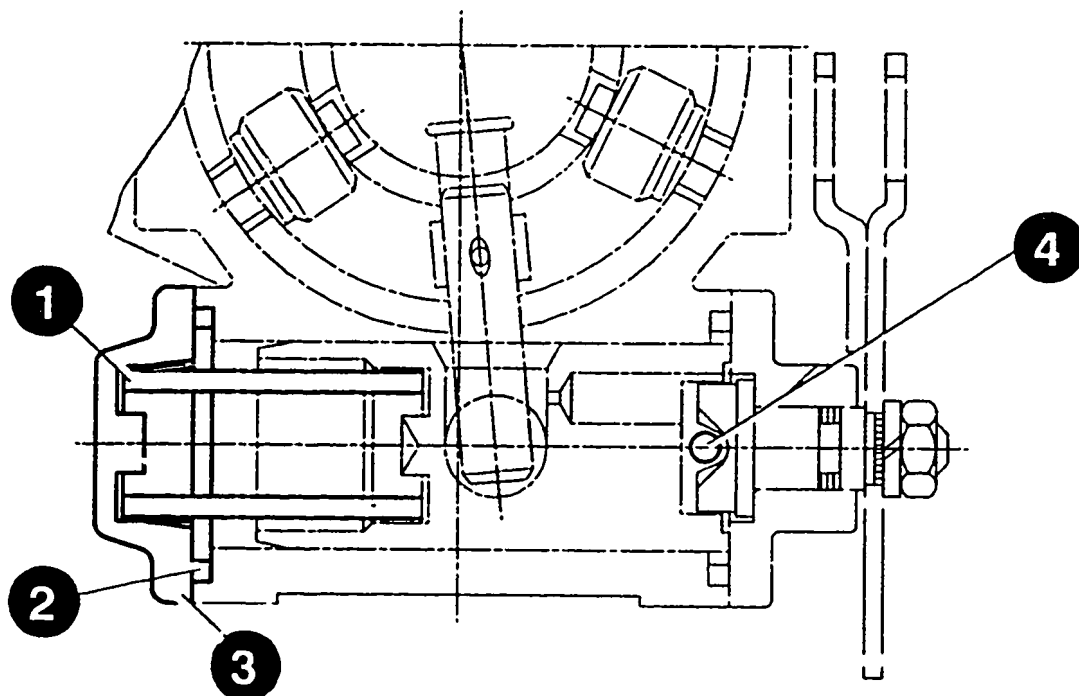
Fit spring, seal ring and timing-device cover.

Loosen fastening screws of KSB cover by half a turn.

Turn stop lever in adjustment direction until shortly prior to OT position of KSB. This operation is of importance as regards centering of the cam with respect to the 4 mm pin in the timing-device piston.

Continue: H05/1 Fig.: H04/2

KMK03397



MEASURING FUNCTION STROKE

Tighten both fastening screws of cover to tightening torque 6...9 Nm . Move stop lever to initial position (UT). Loosen fastening screw of stop plate by half a turn.

Operate stop lever as far as start of timing-device stroke.

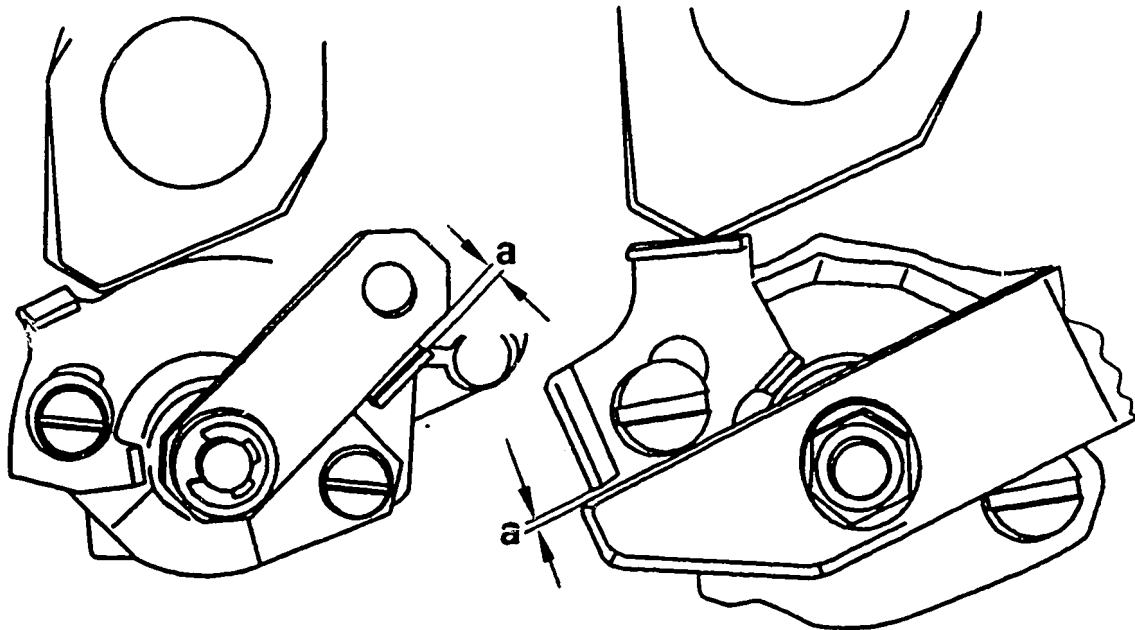
Set stop plate in this lever position to 1 mm clearance (picture, a) before start of timing-device stroke.

Picture, left : Version 1

Picture, right: Version 2

Continue: H17/1 Fig.: H05/2

KMK03398



ATTACHING MECHANICAL COLD START ACCELERATION DEVICE (KSB)

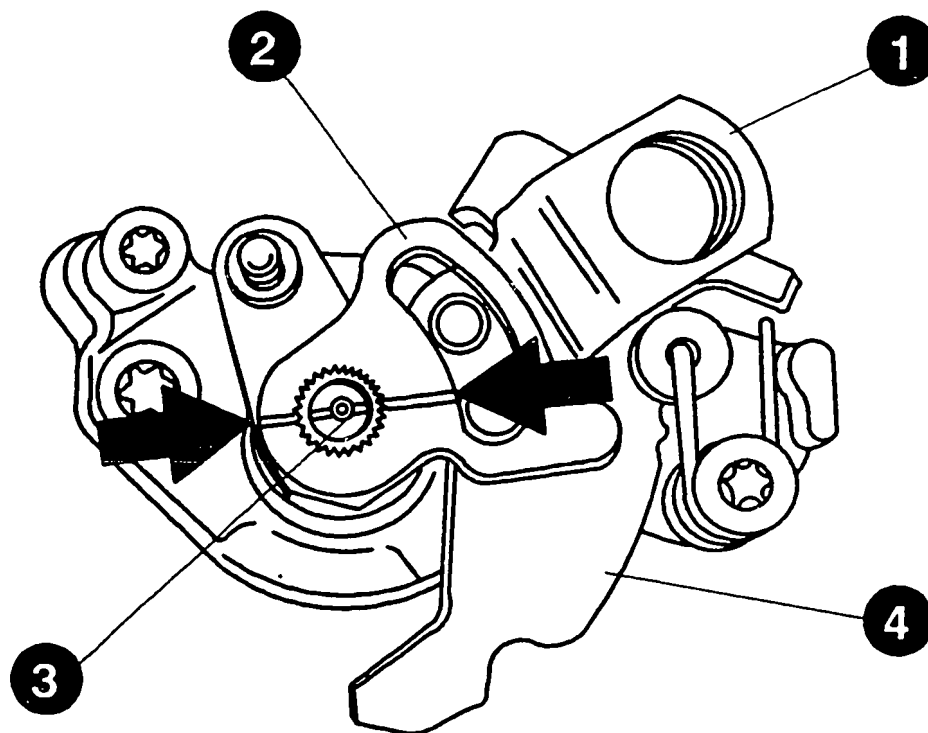
* Version with detent position

- 1 = KSB control lever
- 2 = Basic lever
- 3 = Lever shaft
- 4 = Bell crank

Place KSB control lever on lever shaft and position bell crank against housing stop (housing stop not visible in picture).

Place basic lever with mark on lever shaft tooting such that both marks coincide (arrows).

Continue: H07/1 Fig.: H06/2



KMK02985

ATTACHING MECHANICAL COLD START
ACCELERATION DEVICE (KSB)

* Version with detent position

1 = Basic lever

2 = Tapped hole

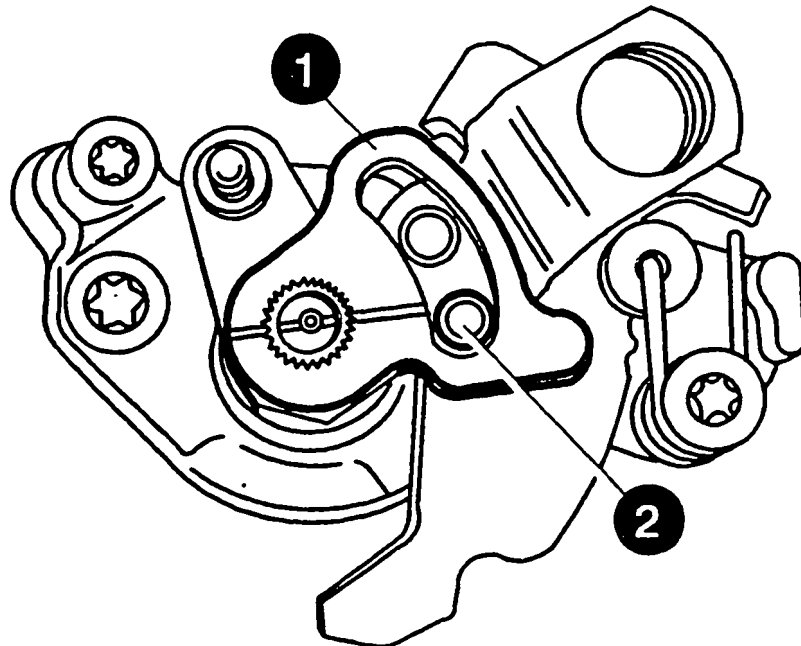
Turn basic lever until tapped hole
makes contact with end of slot.
Screw in fillister-head screw (do not
tighten).

Place spring washer and plain washer
on lever shaft.

Press down plain washer and fit lock
washer.

Continue: H08/1 Fig.: H07/2

KMK03400



**ATTACHING MECHANICAL COLD START
ACCELERATION DEVICE (KSB)**

*** Version with detent position**

1 = Basic lever

2 = Fastening screw

Determine KSB stroke:

**Fix KSB control lever in 2nd detent
position.**

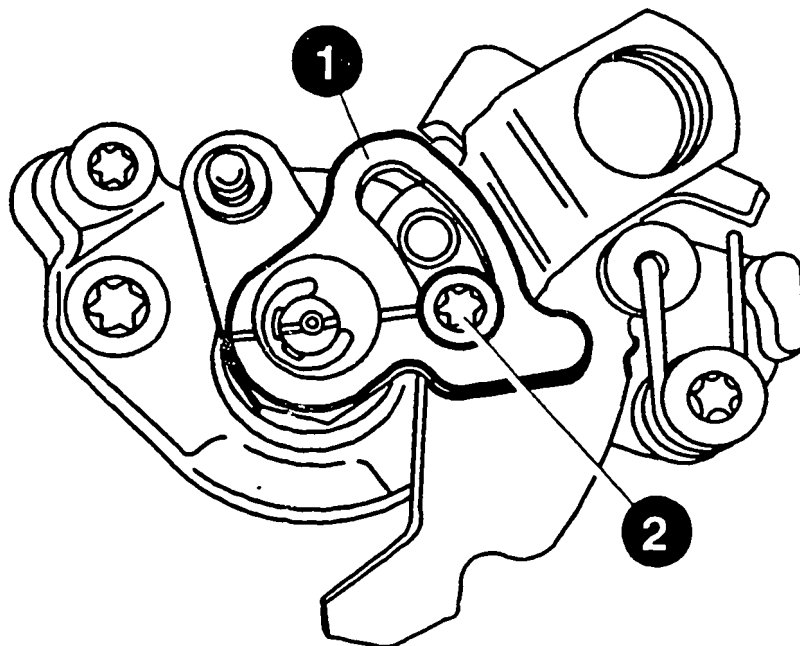
**Turn basic lever until pressure point
(start of stroke) is reached.**

Fix basic lever in this position.

Tighten fastening screw.

Continue: H17/1 Fig.: H08/2

KMK03401

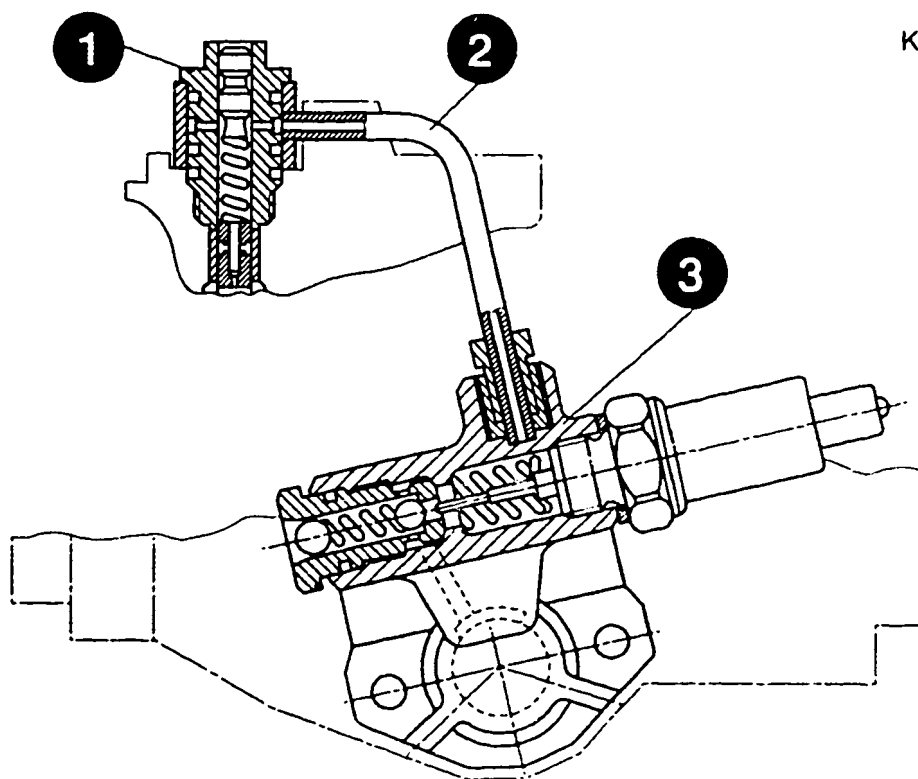


ATTACHING HYDRAULIC COLD START ACCELERATION DEVICE

- 1 = Pressure regulator
- 2 = Ring main
- 3 = KSB control valve

Install KSB control valve on spring
side of timing device.

Continue: H10/1 Fig.: H09/2



KMK03329

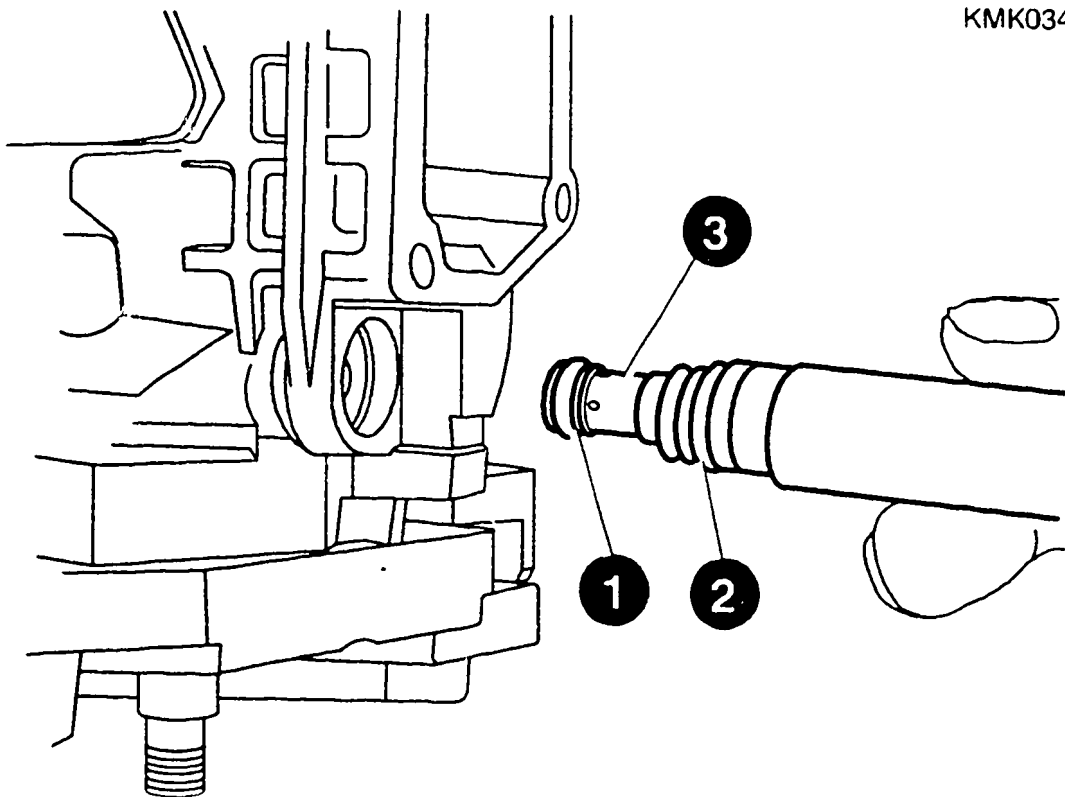
INSTALLING PRESSURE REGULATOR

- 1 = O-ring
- 2 = O-ring
- 3 = Pressure regulator

Attach O-ring to pressure regulator.
Use socket wrench KDEP 1086 to screw
pressure regulator into pump housing.

Install ring main for KSB control
valve.

Continue: H18/1 Fig.: H10/2



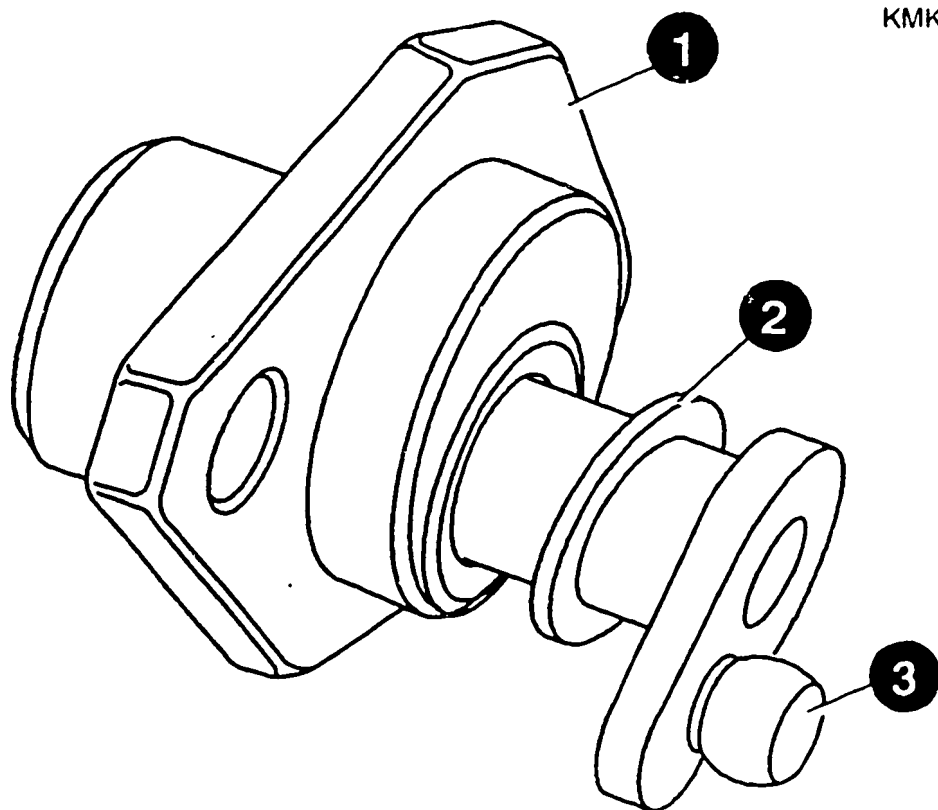
**ATTACHING TEMPERATURE-CONTROLLED
COLD START ACCELERATION DEVICE (KSB)**

- 1 = Fitting cover**
- 2 = Shim**
- 3 = Setting shaft**

Insert setting shaft with shim into fitting cover.

Insert O-ring in recess in fitting cover on control lever end and press completely into seat.

Continue: H12/1 Fig.: H11/2



KMK03403

ATTACHING TEMPERATURE-CONTROLLED
COLD START ACCELERATION DEVICE (KSB)

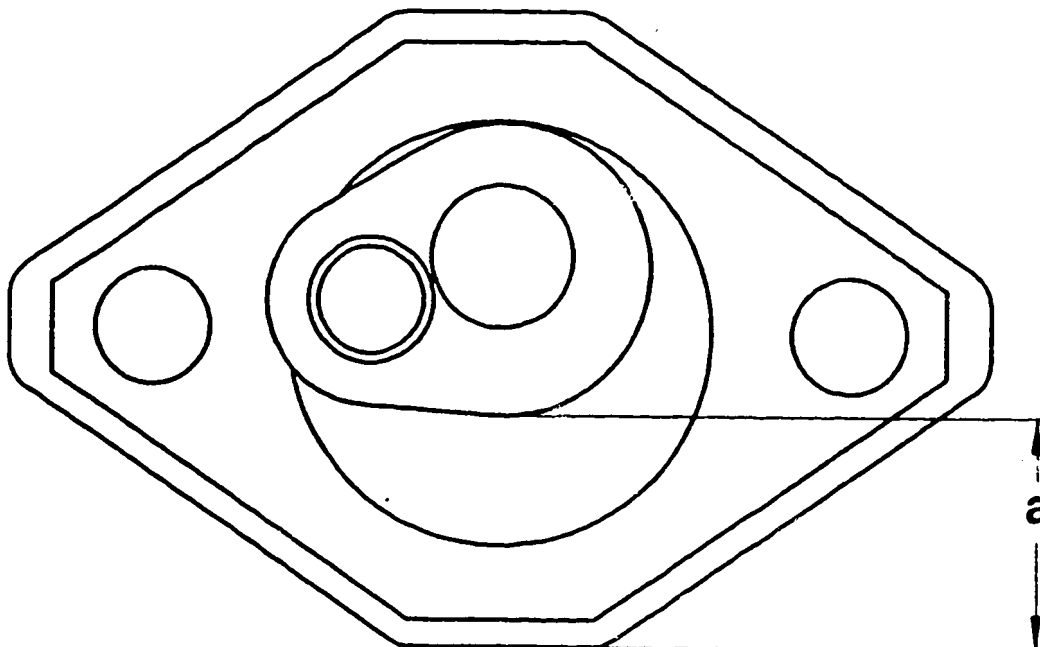
Swivel fitting cover such that inside
of cover with spherical bolt of
adjustment shaft faces upwards.

The guide hole in the adjustment shaft
is arranged eccentrically in the
fitting cover.

When fitting cover is viewed from top,
the larger spacing between cover and
hole edge must point towards body (a).

Continue: H13/1 Fig.: H12/2

KMK03404

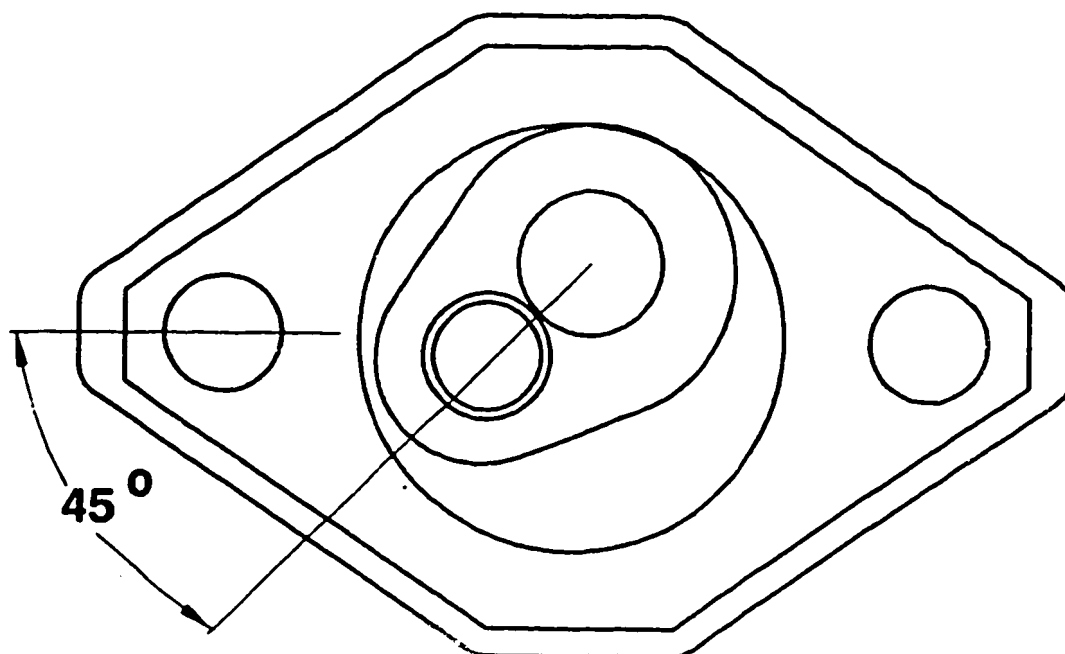


ATTACHING TEMPERATURE-CONTROLLED
COLD START ACCELERATION DEVICE (KSB)

Swivel adjustment shaft to approx. 45°
with respect to cross-axis of fitting
cover.

Continue: H14/1 Fig.: H13/2

KMK03405



ATTACHING TEMPERATURE-CONTROLLED COLD START ACCELERATION DEVICE (KSB)

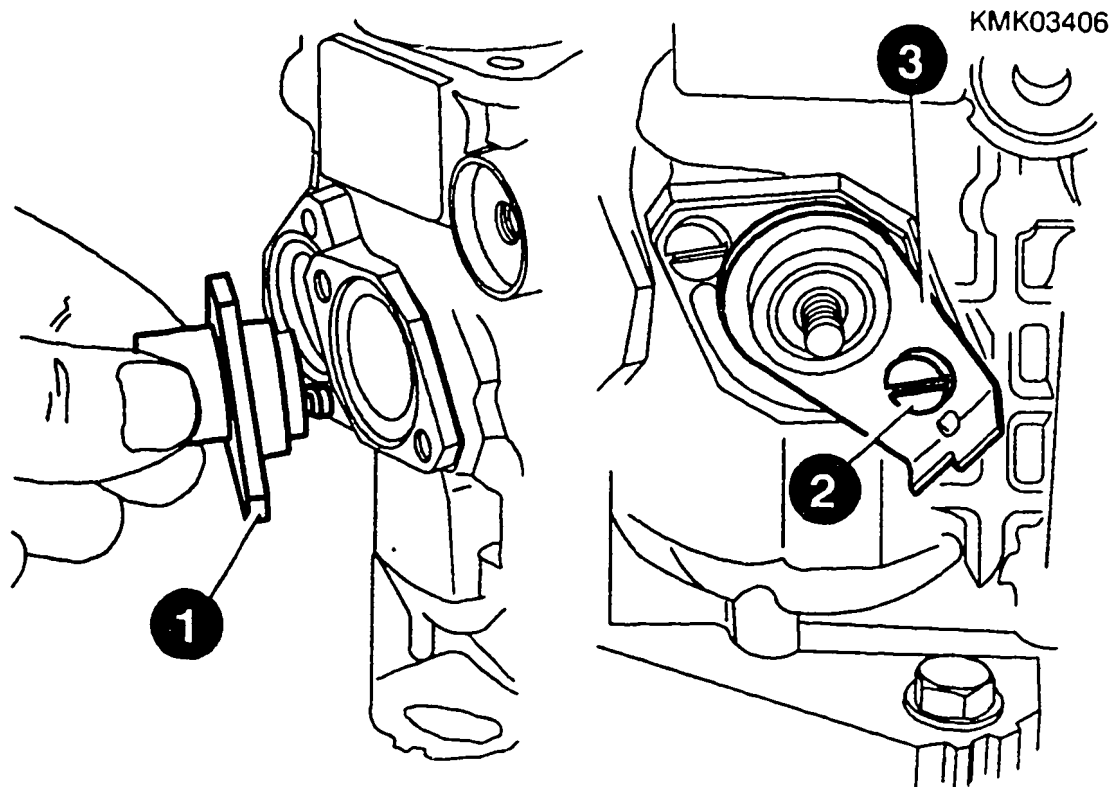
- 1 = Fitting cover
- 2 = Fastening screws
- 3 = Stop bracket

Insert O-ring into pump housing.

Insert adjustment shaft.
Ensure that spherical bolt faces pump
drive end (arrow).

Screw fitting cover and stop bracket
to pump housing with fastening screws
(picture, right).

Continue: H15/1 Fig.: H14/2



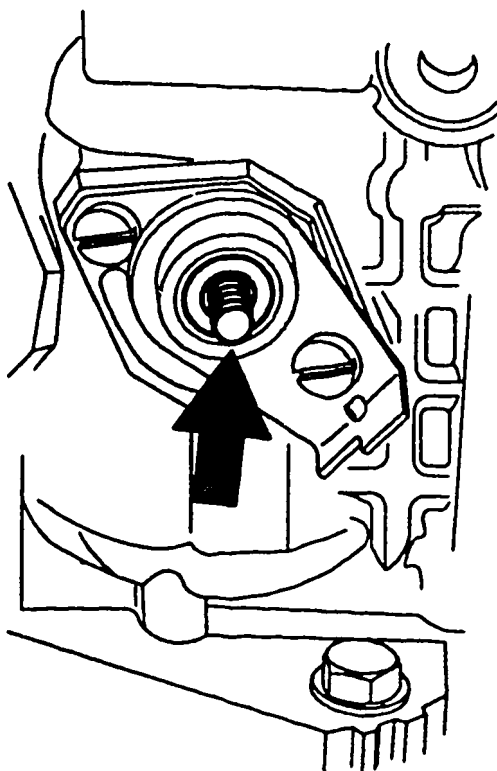
ATTACHING TEMPERATURE-CONTROLLED COLD START ACCELERATION DEVICE (KSB)

Arrow = Setting shaft

Turn setting shaft by hand in
direction of arrow until it makes
noticeable contact with cam roller
ring.

Continue: H16/1 Fig.: H15/2

KMK03407



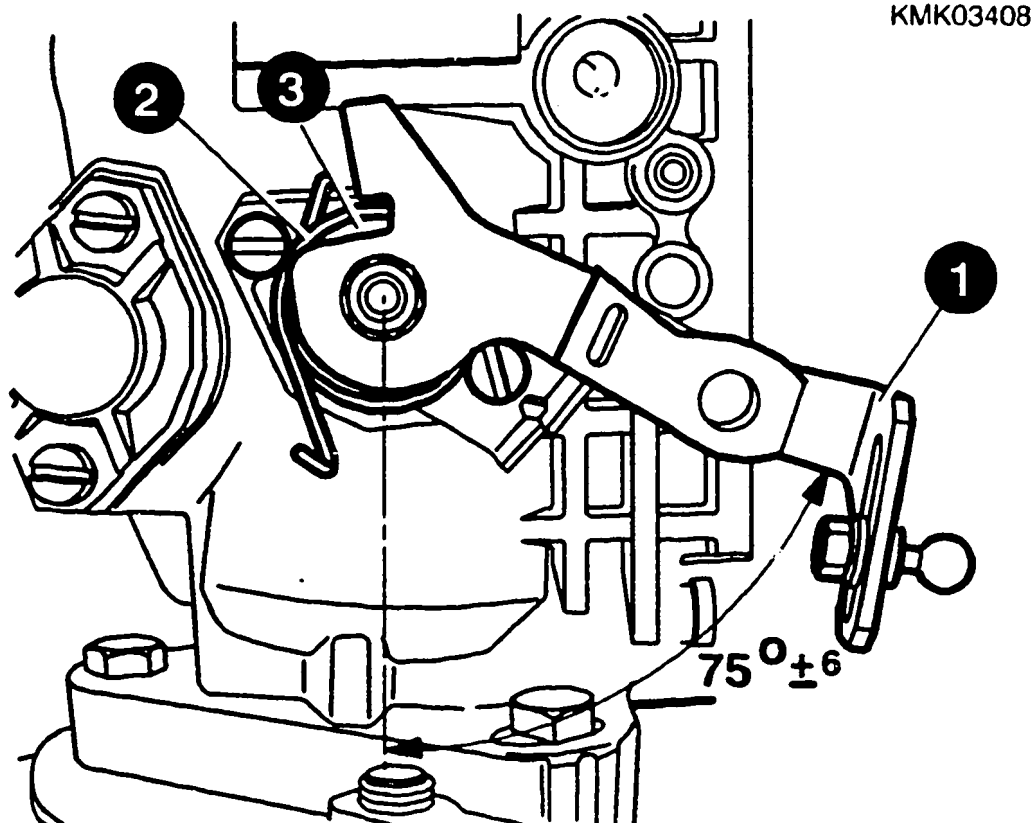
ATTACHING TEMPERATURE-CONTROLLED COLD START ACCELERATION DEVICE (KSB)

- 1 = Control lever
- 2 = Cylindrical helical coiled spring
- 3 = Shim

Fit cylindrical helical coiled spring and shim.

Attach control lever at angle of $75^{\circ} \pm 6^{\circ}$ to pump longitudinal axis to setting shaft and secure with hexagon nut.

Continue: H17/1 Fig.: H16/2



INSTALLING PRESSURE REGULATOR

1 = O-ring

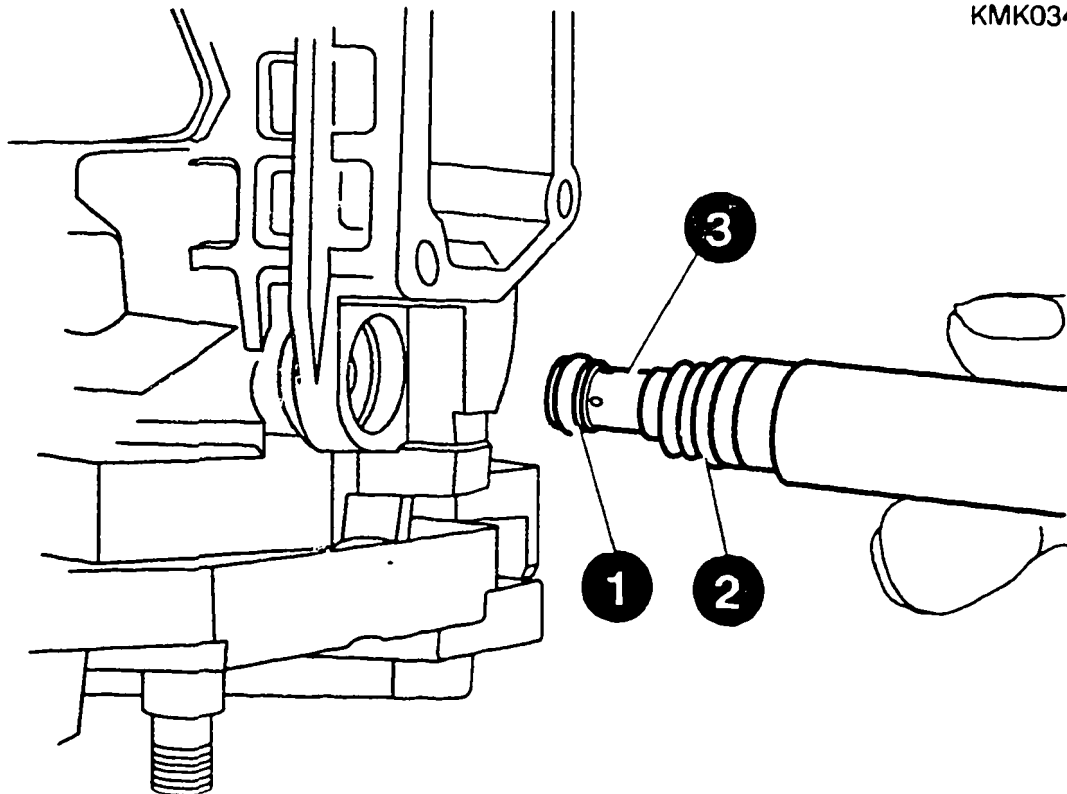
2 = O-ring

3 = Pressure regulator

Attach O-rings to pressure regulator.

Use socket wrench KDEP 1086 to screw pressure regulator into pump housing.

Continue: H18/1 Fig.: H17/2



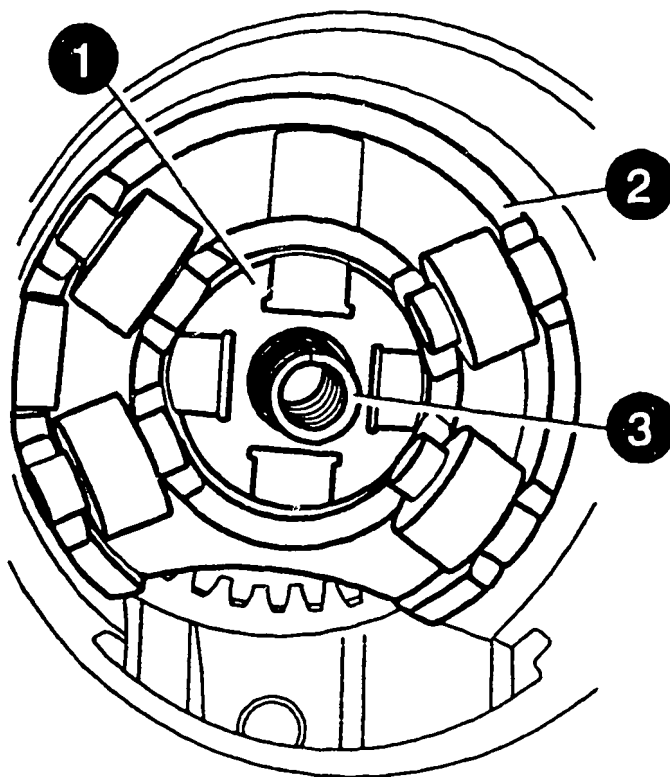
INSTALLING SLOTTED WASHER

- 1 = Slotted washer
- 2 = Cam roller ring
- 3 = Compression spring

Insert slotted washer in cam roller ring. In doing so, pay attention to following installation position:
If there is a compression spring between slotted washer and cam plate, the larger hole envisaged for this purpose must face towards distributor-head side.

Continue: H19/1 Fig.: H18/2

KMK0340S



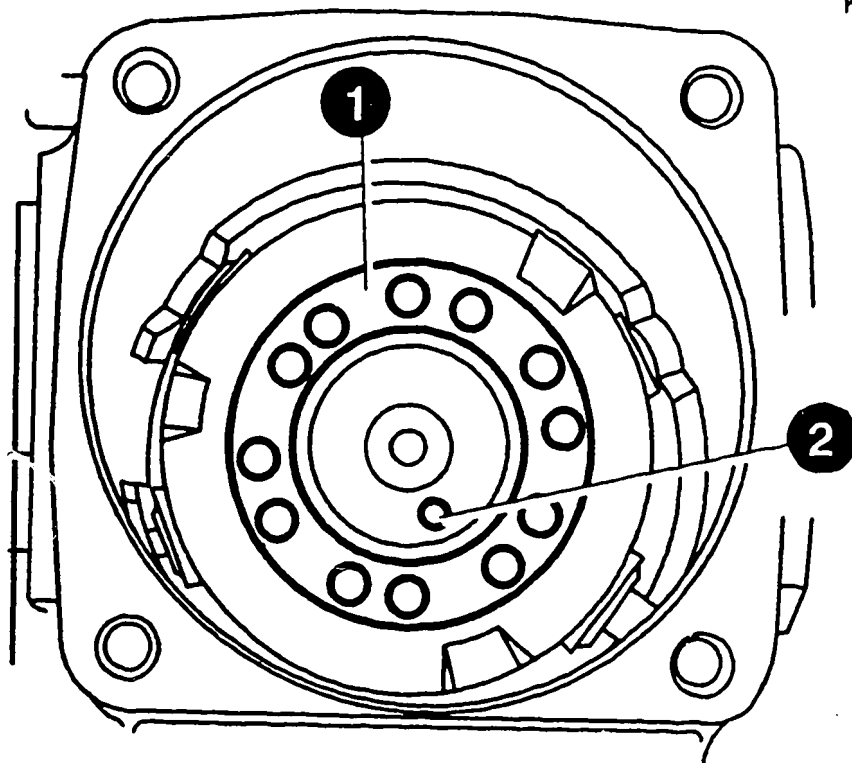
INSTALLING CAM PLATE

- 1 = Cam plate
- 2 = Driver pin

Insert cam plate such that driver pin faces in direction of Woodruff-key groove of drive shaft.

Continue: H20/1 Fig.: H19/2

KMK03410

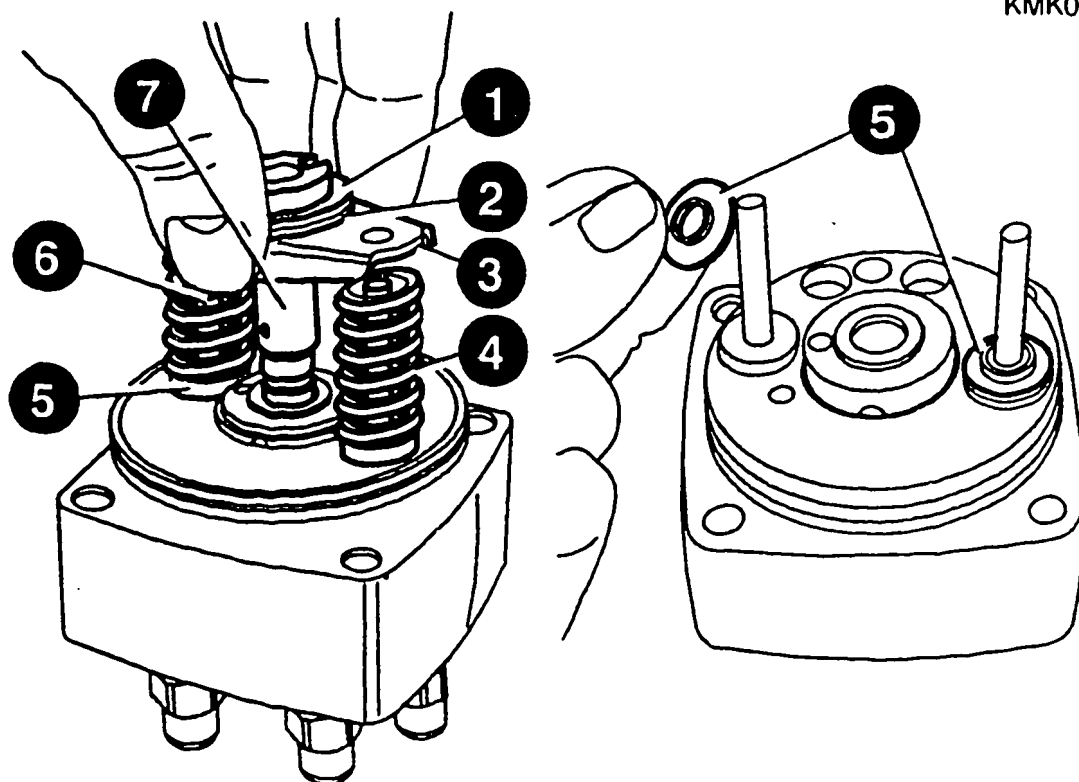


DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

- 1 = Shim
- 2 = Slotted washer
- 3 = Top spring seat
- 4 = Compression springs
- 5 = Bottom spring seat
- 6 = Guide pins
- 7 = Distributor-pump plunger

Insert guide pins into distributor head; slip both bottom spring seats without spacers onto guide pins.
NOTE: Spacers are positioned beneath spring seats (picture, right).

Continue: H21/1 Fig.: H20/2



KMK03411

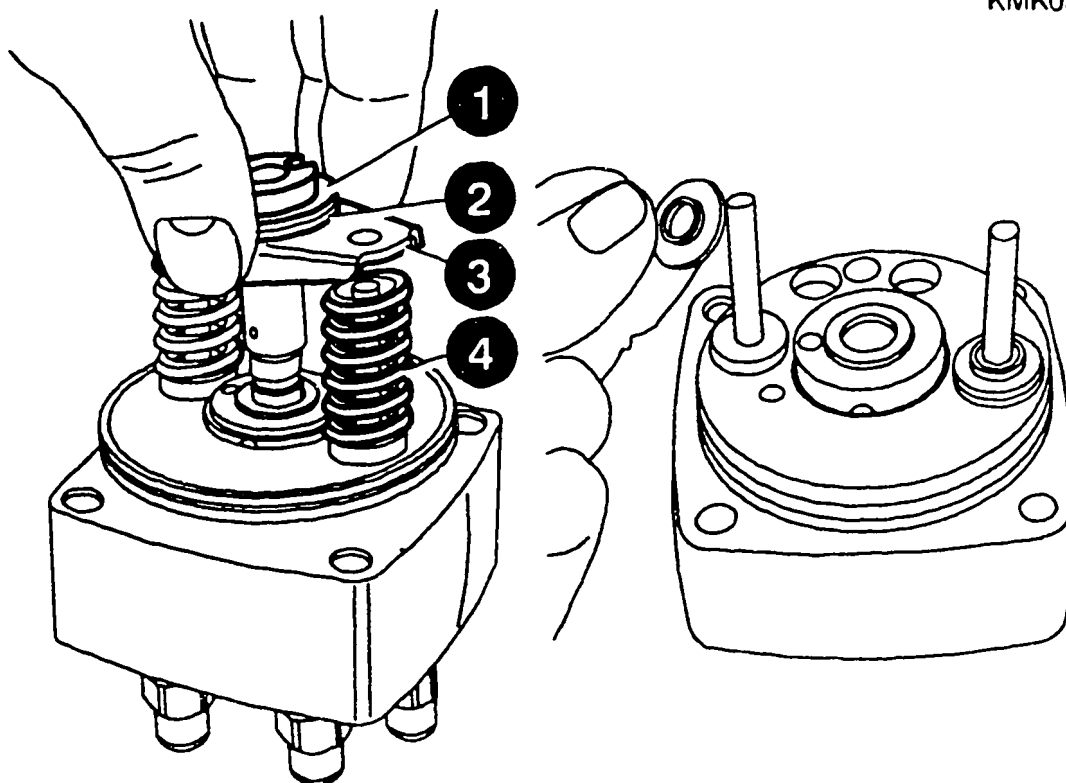
DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

- 1 = Shim
- 2 = Slotted washer
- 3 = Spring seat
- 4 = Compression springs

Fit compression springs.
Attach shim, slotted washer and spring
seat to distributor-pump plunger.
Insert distributor-pump plunger,
complete into distributor head
exerting maximum caution.

Continue: H22/1 Fig.: H21/2

KMK03412



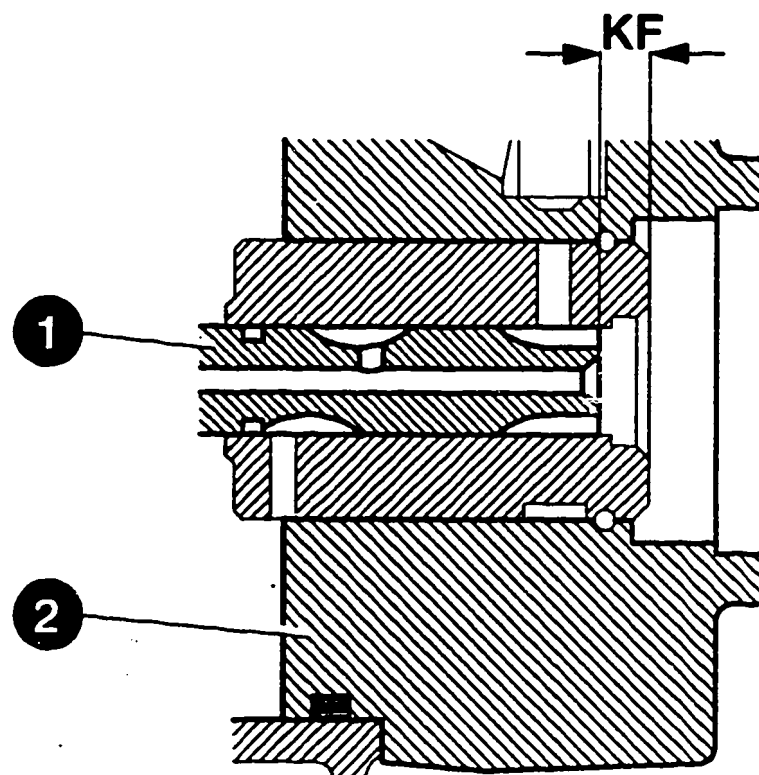
DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

- 1 = Distributor-pump plunger
- 2 = Distributor head

The dimension "KF" is the distance between the end-face sealing surface of the distributor head and the end face of the distributor-pump plunger (see picture).

Calibration is effected with dial indicator and holder (KDEP 1088).

Continue: H23/1 Fig.: H22/2



KMK03413

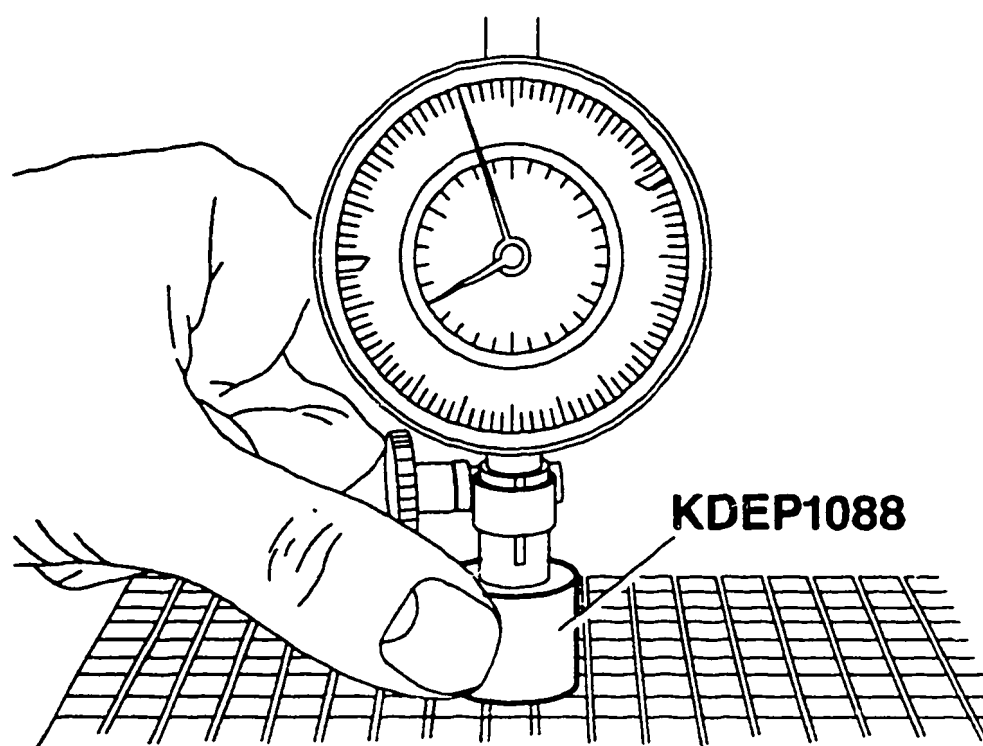
DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

Clamp dial indicator 1 687 233 012
with measurement insert in position in
holder KDEP 1088.

Position holder on marking plate such
that it is flat, initially tension
dial indicator approx. 20 mm and
set to "0".

Continue: H24/1 Fig.: H23/2

KMK03414

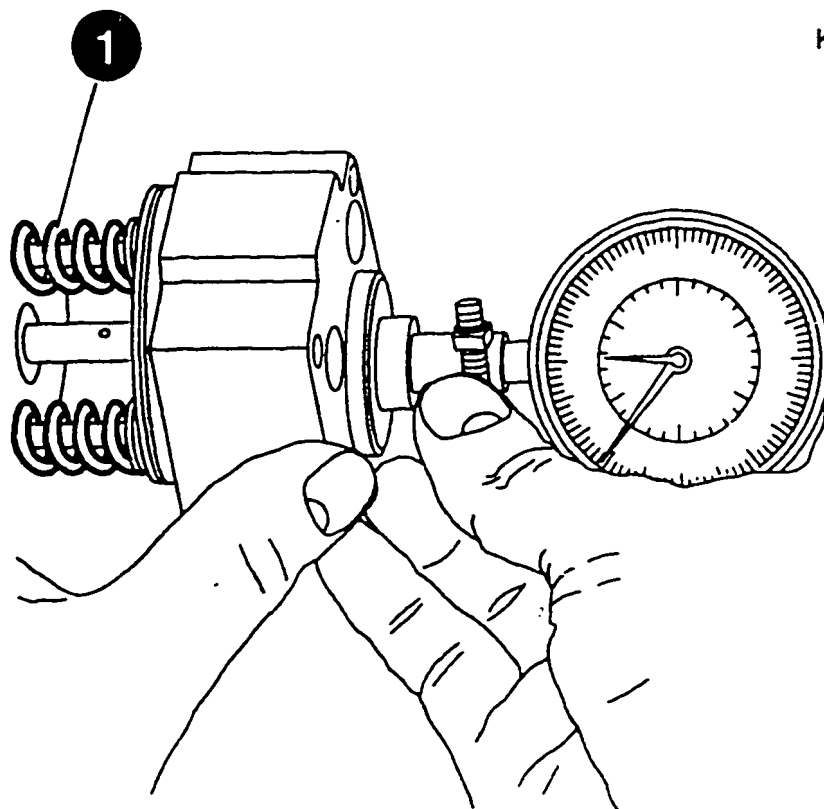


DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

- 1 = Compression spring
- 2 = Spring seat

Hold distributor head such that it is horizontal (see picture).
Place dial-indicator holder KDEP 1088 such that it is flat on sealing surface in distributor head.
Exert axial pressure on bottom of distributor-pump plunger and make friction-locked connection only for compression springs.
(DO NOT OVERCOMPRESS SPRINGS!)

Continue: H25/1 Fig.: H24/2



KMK03415

DETERMINING PLUNGER RETURN SPRING DIMENSION "KF"

- 1 = Spacers
- 2 = Spring seat

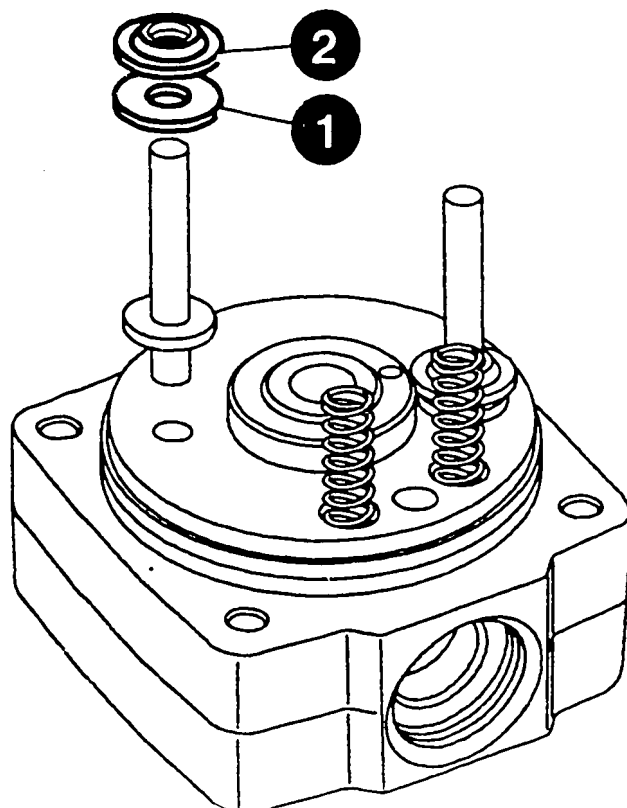
Compare measured dimension (red dial-indicator numbers) to desired dimension "KF" given in test-specification sheet.

Provide compensation if necessary with appropriate spacers (beneath spring seat). If the selection is between 2 existing shim thicknesses, the thicker spacer is to be chosen.

Note:

There may only be one shim of same thickness on either side.

Continue: H26/1 Fig.: H25/2



KMK03416

ASSEMBLING HOUSING COVER

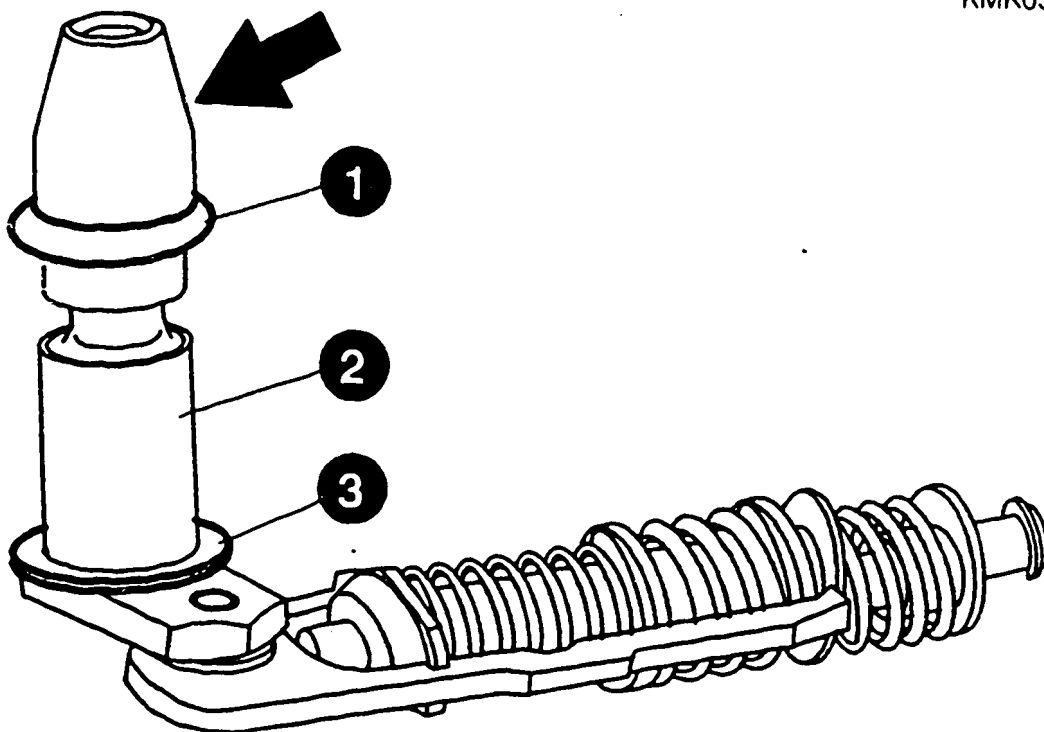
- 1 = O-ring
- 2 = Setting shaft
- 3 = Shim

Slip shim onto setting shaft; fit
O-ring with assembly sleeve KDEP 2937
(arrow).

Pull setting shaft with assembly wrench
KDEP 1096 through housing cover.

Continue: H27/1 Fig.: H26/2

KMK03309



ASSEMBLING HOUSING COVER

Place cylindrical helical coiled spring on housing cover.

— ~~Part-load-governor version~~

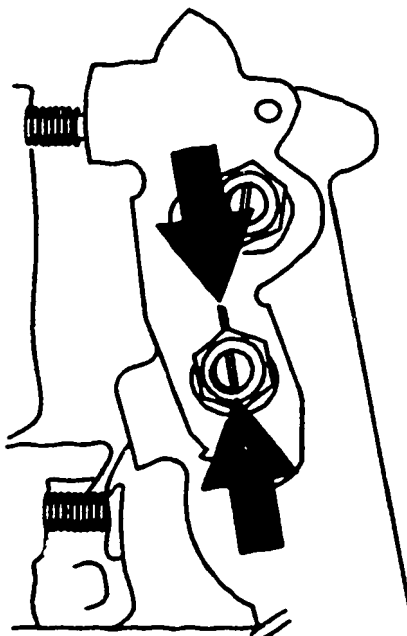
Position control lever on setting shaft such that marks on control lever and setting shaft coincide (arrows — picture).

— ~~Variable-speed-governor version~~

Fit control lever in parallel with lever of setting shaft.

Fit hexagon nut with spring lock washer (not illustrated).

Continue: H28/1 Fig.: H27/2



KMK02289

ADJUSTING STOP REGULATION LEVER

Select adjustment in line with following characteristic features:

- * Pump with stop lever and TAS
(temperature-dependent
excess fuel quantity) J01/1
- * Pump with no stop lever J26/1

Continue: J01/1

ADJUSTING STOP REGULATION LEVER

If the attachment position of the stop lever/TAS with respect to the lever shaft has not been marked, assignment must be calibrated.

Adjustment of the various shutoff devices is governed by the shape of the stop lever/the shape of the regulating lever.

Continue: J01/2

ADJUSTING STOP REGULATION LEVER

Select stop-lever versions as per illustration:

	Coordinate
* TAS version	J02/1
* Normal version	
Stop-lever stop on left	J03/1
* Normal version	
Stop-lever stop on right	J04/1
* Special version A	J05/1
* Special version B	J06/1
* Negative torque control	J07/1

Continue: J02/1

ADJUSTING SHUTOFF REGULATING LEVER

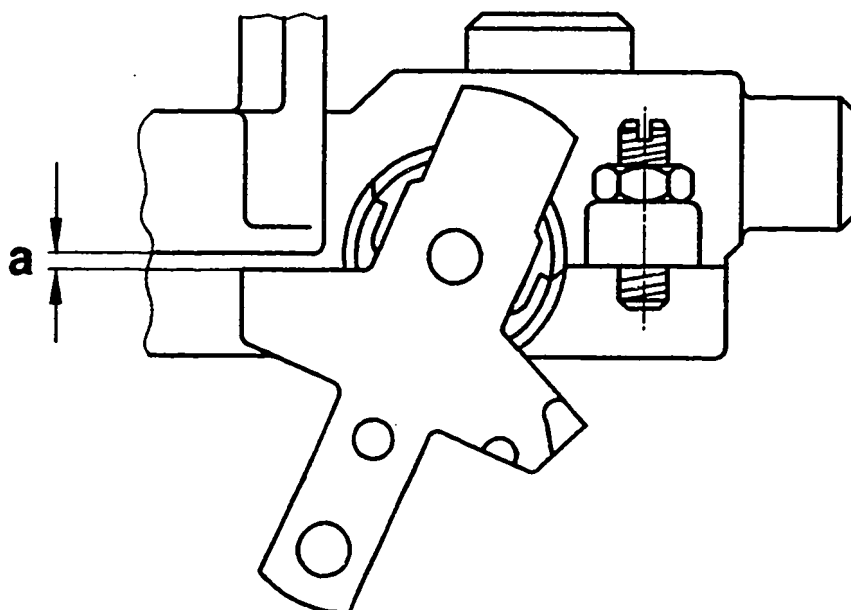
Version: Temperature-dependent excess
fuel quantity (TAS)

Continue: J08/1

ADJUSTING STOP/REGULATING LEVER

Stop lever, left
Standard version

Continue: J10/1 Fig.: J03/2

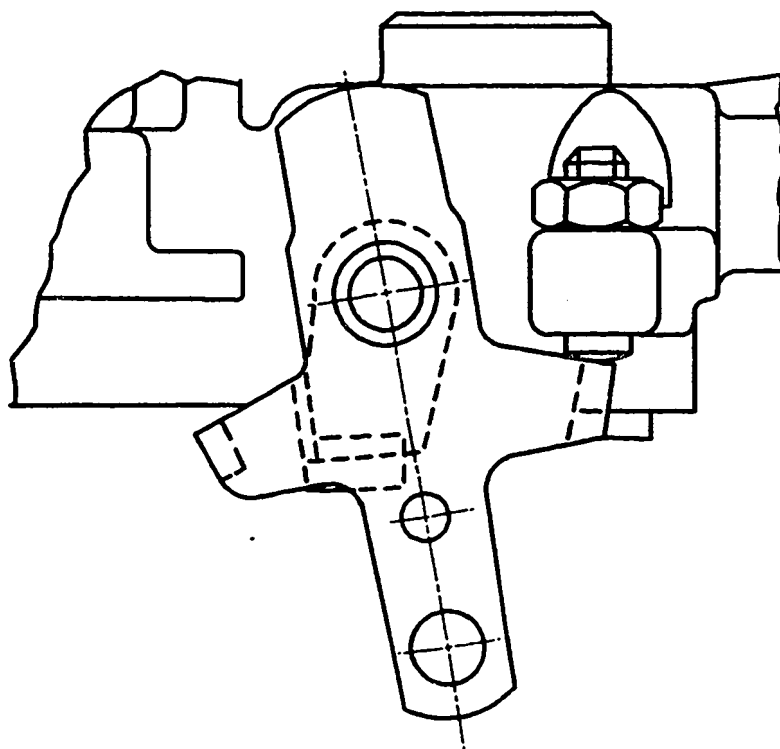


KMK02290

ADJUSTING STOP/REGULATING LEVER

Stop lever, right
Standard version

Continue: J12/1 Fig.: J04/2

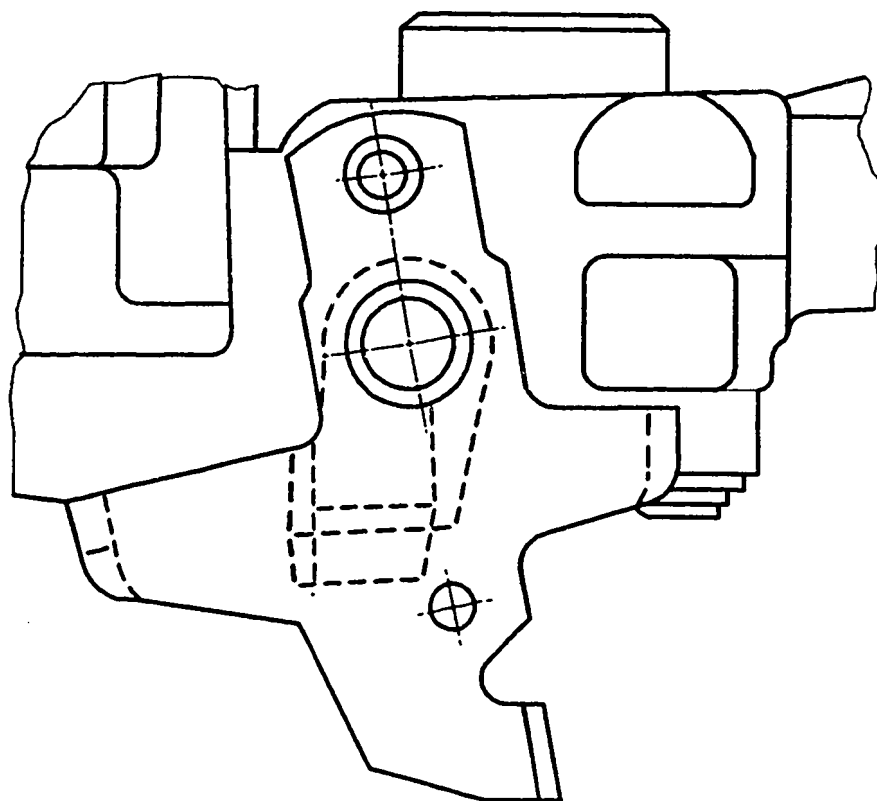


KMK02291

ADJUSTING STOP/REGULATING LEVER

Stop lever –
Special version A:

Continue: J16/1 Fig.: J05/2

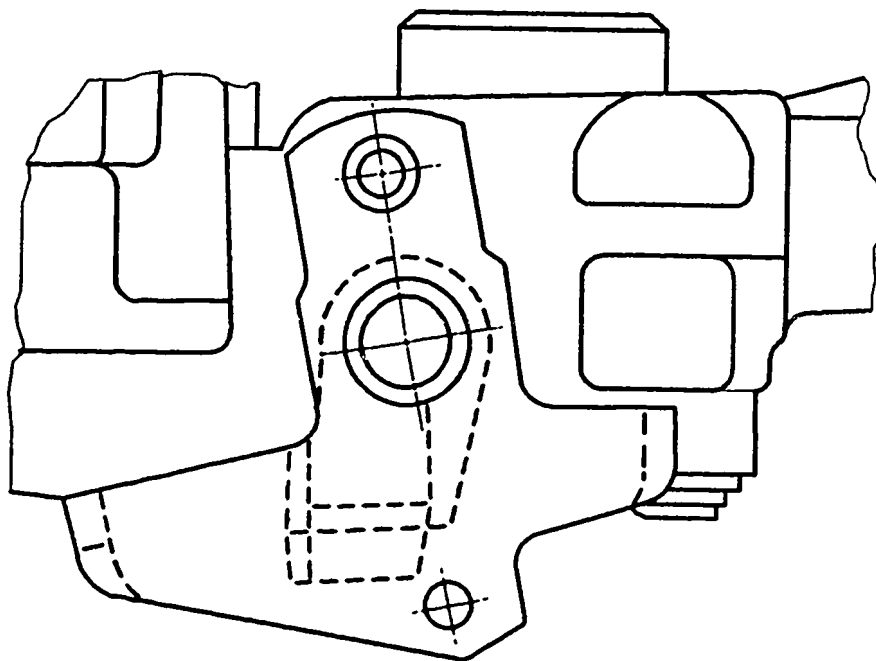


KMK02292

ADJUSTING STOP/REGULATING LEVER

Stop lever –
Special version B

Continue: J19/1 Fig.: J06/2

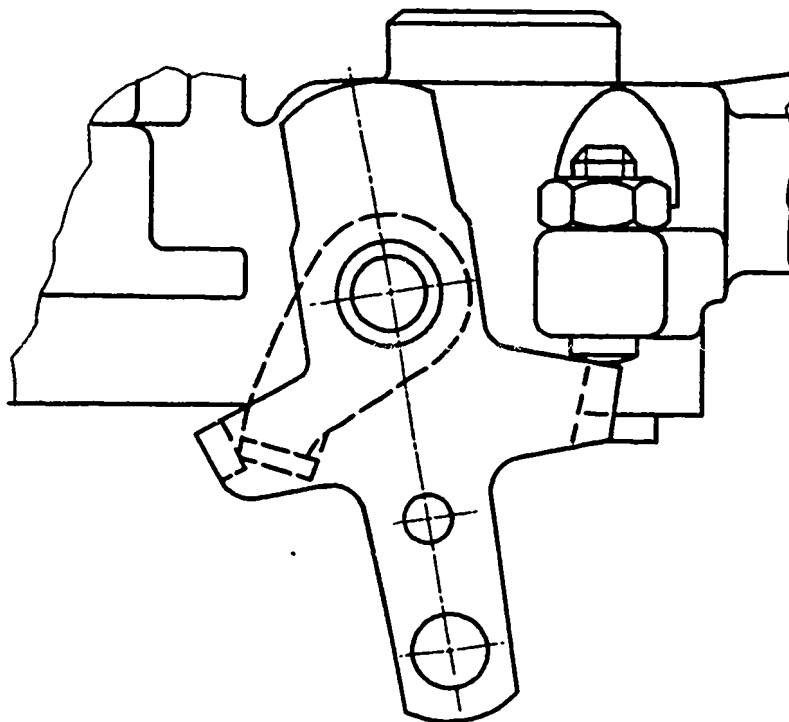


KMK02293

ADJUSTING STOP/REGULATING LEVER

Stop lever –
Negative torque control

Continue: J22/1 Fig.: J07/2



KMK02294

ADJUSTING SHUTOFF REGULATING LEVER

* TAS version

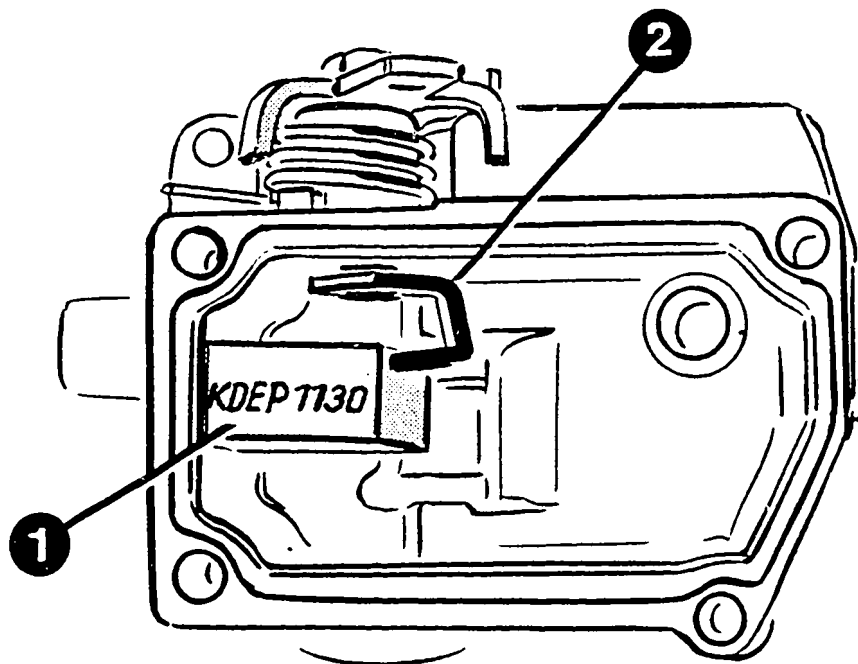
1 = Spacer

2 = Regulating lever

Insert lever shaft into housing cover.

Place spacer KDEP 1130 between inside edge of housing cover and regulating lever.

Continue: J09/1 Fig.: J08/2



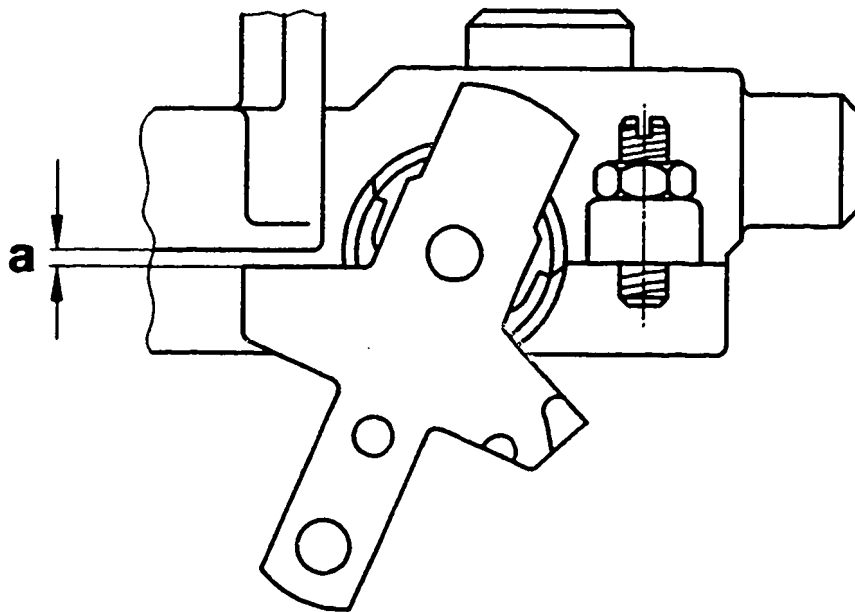
KMK 02295

ADJUSTING SHUTOFF REGULATING LEVER

* TAS version

In this position, mount regulating lever such that there is an extremely small gap of min. 3.0 mm between regulating lever and housing cover.

Continue: J26/1 Fig.: J09/2



KMK02290

ADJUSTING STOP/REGULATING LEVER

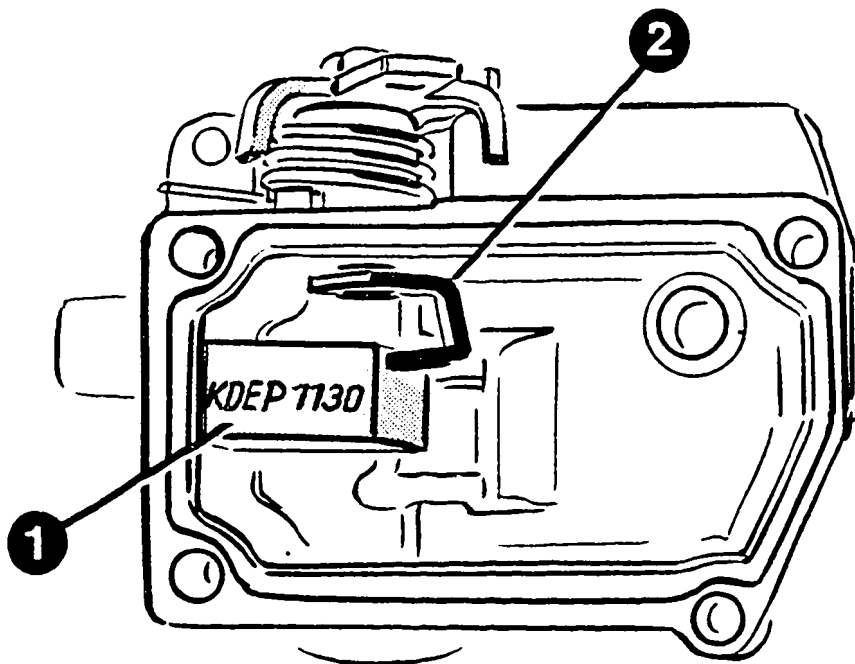
* Stop lever, left, standard version

1 = Spacer KDEP 1130

2 = Regulating lever

Position spacer KDEP 1130 between inside edge of housing cover and regulating lever.

Continue: J11/1 Fig.: J10/2



KMK 02295

ADJUSTING STOP/REGULATING LEVER

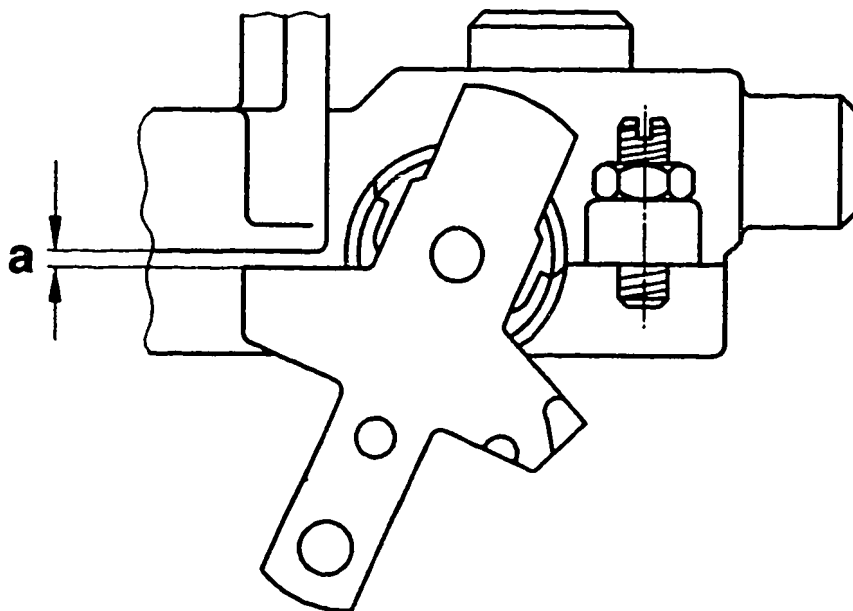
* Stop lever, left, standard version

Position stop lever on setting shaft.

There must be a gap "a" = 2...5 mm
between stop lever and housing in this
position.

If not, alter stop lever.

Continue: J26/1 Fig.: J11/2



KMK02290

ADJUSTING STOP/REGULATING LEVER

* Stop lever, right, standard version

1 = Measurement tool

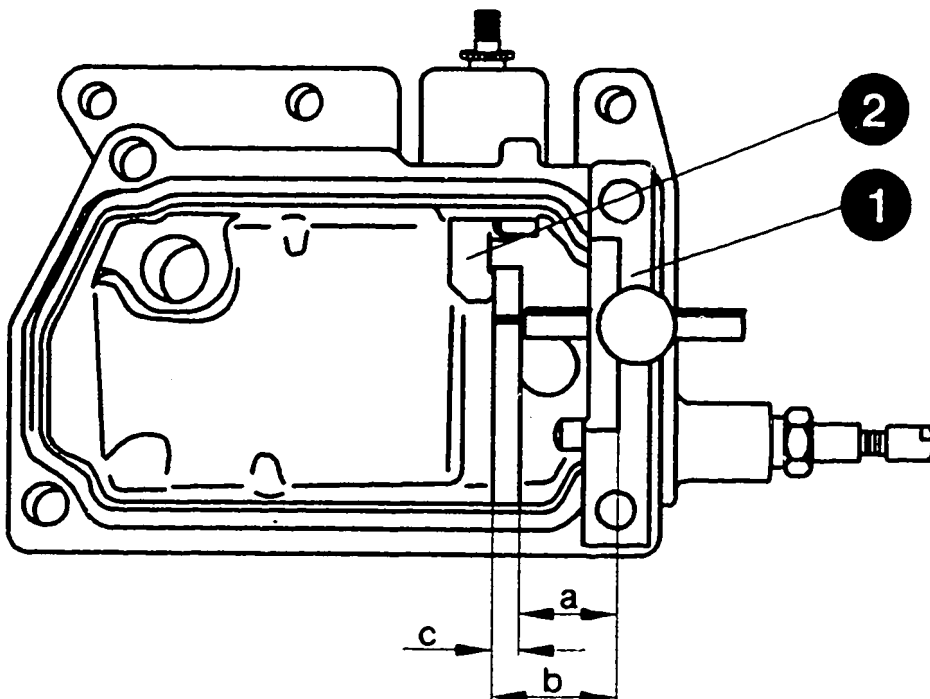
2 = Regulating lever

Attach KDEP 1152/3 to housing cover;
determine and note down dimension "c"
(thickness of measurement arm).

Calculate dimension "a" ($a=b-c$) and
adjust measurement arm to this
dimension.

Dimension "b" = 19.3 mm

Continue: J13/1 Fig.: J12/2



KMK02296

ADJUSTING STOP/REGULATING LEVER

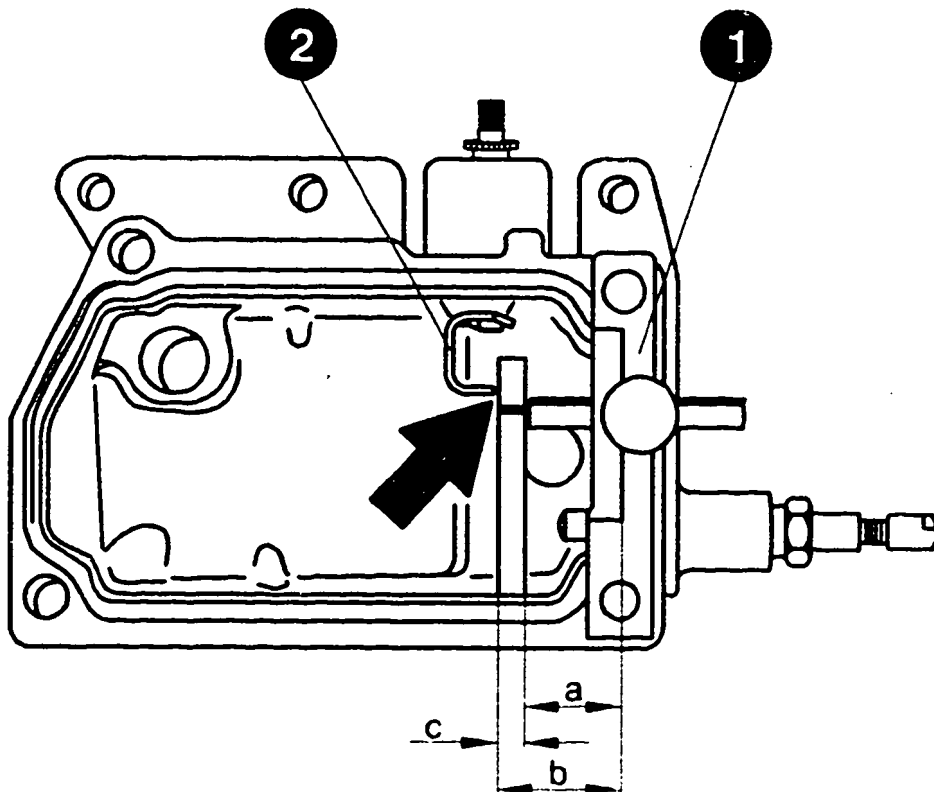
* Stop lever, right, standard version

1 = Measurement tool

2 = Regulating lever

Clamp measurement tool KDEP 1152/3 in this position and press regulating lever against measurement arm (arrow). Regulating lever must be in contact with measurement arm KDEP 1152/3 for subsequent operations.

Continue: J14/1 Fig.: J13/2



KMK02297

ADJUSTING STOP/REGULATING LEVER

* Stop lever, right, standard version

1 = Stop lever

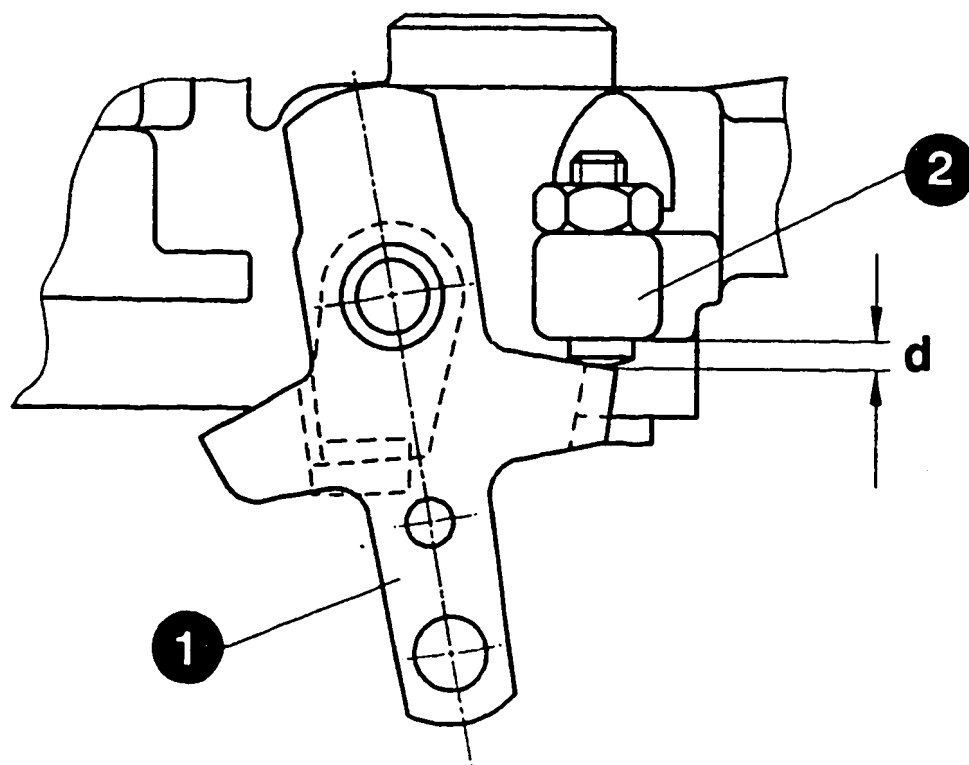
2 = Housing stop

Position stop lever on setting-shaft tooting such that dimension "d" between lever and housing stop is as small as possible.

Engage spring.

Press stop lever in direction of housing stop and, at the same time, tighten hexagon nut on setting shaft. Tightening torque 5...10 Nm.

Continue: J15/1 Fig.: J14/2



KMK02298

ADJUSTING STOP/REGULATING LEVER

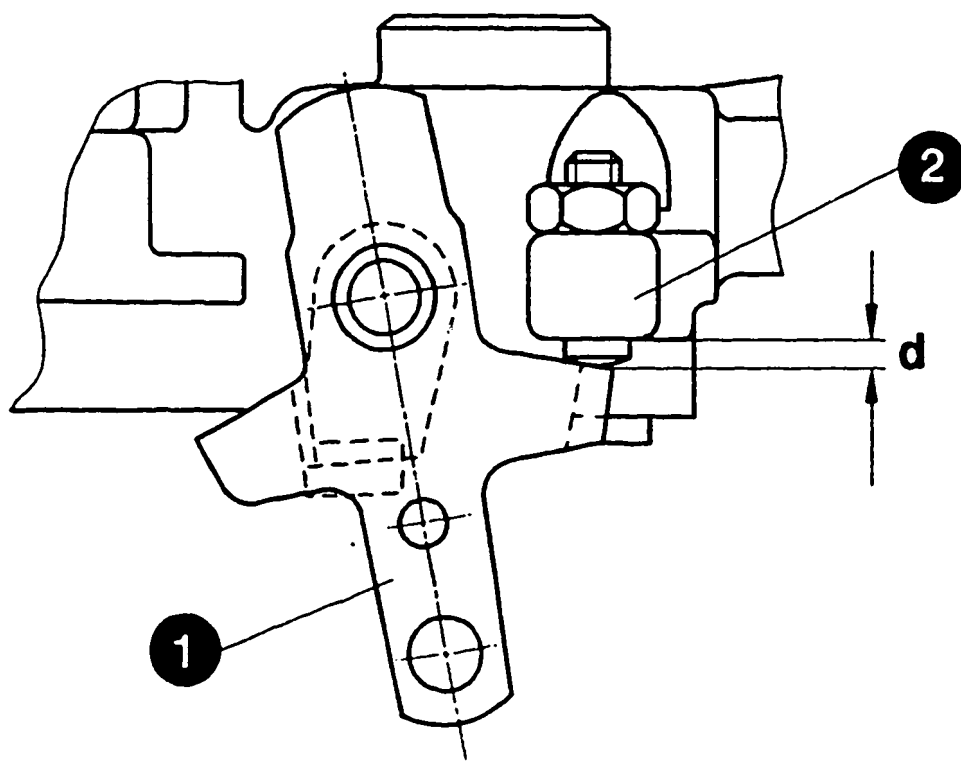
* Stop lever, right, standard version

1 = Stop lever

2 = Stop screw

Close stop screw on stop lever
(dimension "d") and tighten lock nut
to tightening torque of 6...9 Nm.

Continue: J26/1 Fig.: J15/2



KMK02298

ADJUSTING STOP/REGULATING LEVER

* Special version A

1 = Measurement tool

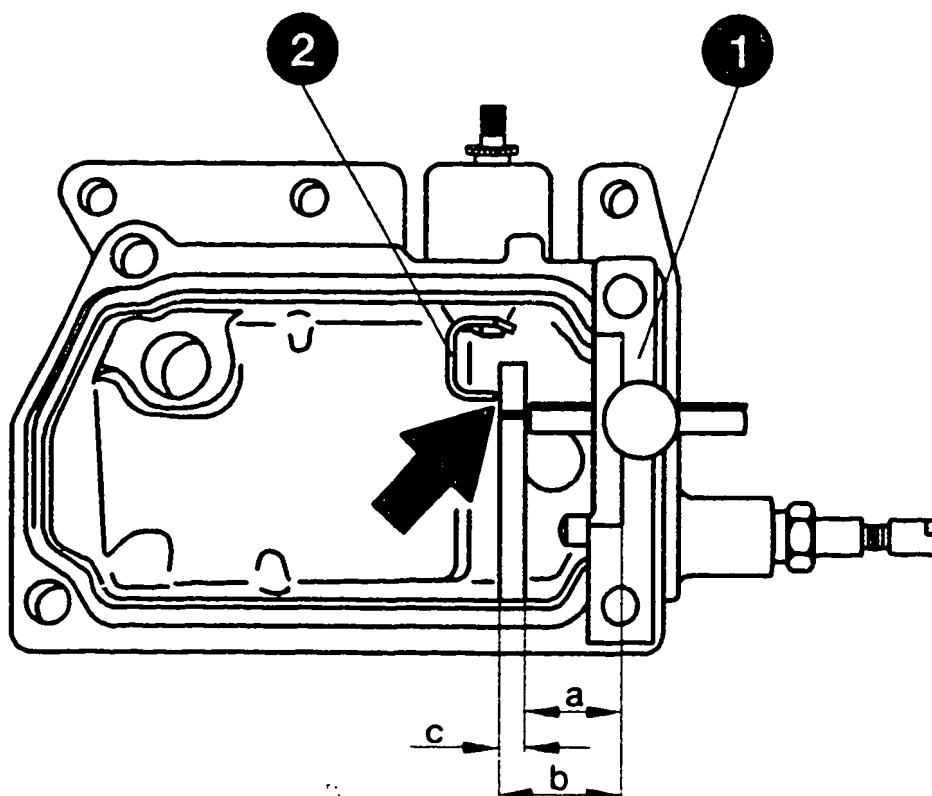
2 = Regulating lever

Position KDEP 1152/3 on housing cover;
determine and note down dimension "c"
(thickness of measurement arm).

Calculate dimension "a" ($a = b - c$)
and set measurement arm to this
dimension.

Dimension "b" = 20.3 mm

Continue: J17/1 Fig.: J16/2



KMK02297

ADJUSTING STOP/REGULATING LEVER

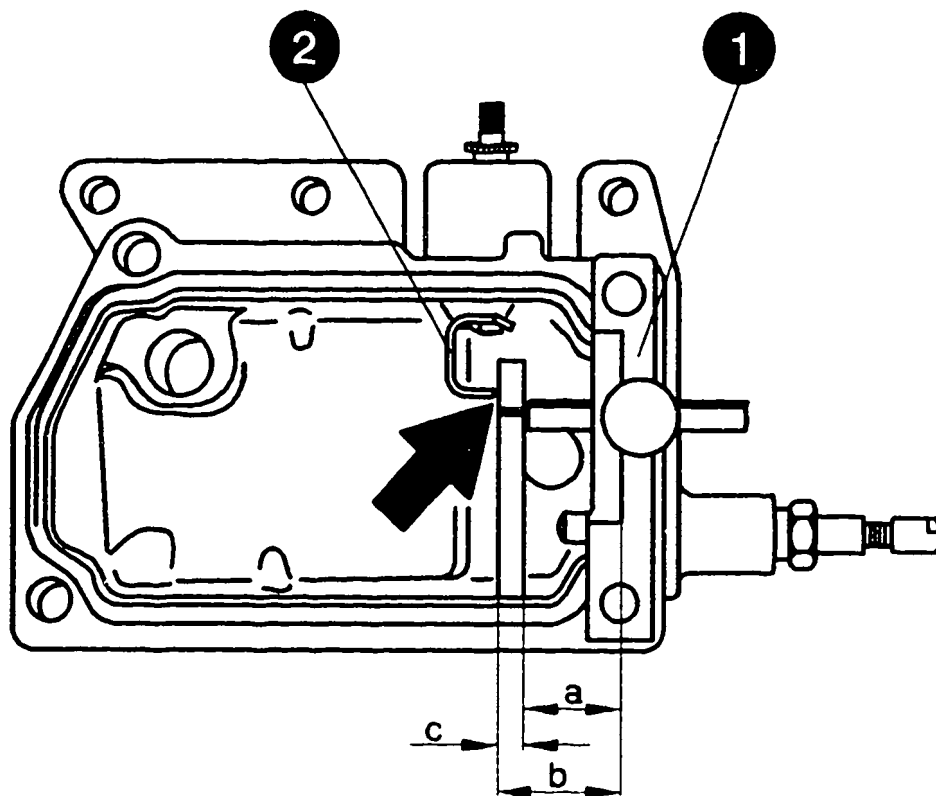
* Special version A

1 = Measurement tool

2 = Regulating lever

Clamp measurement tool KDEP 1152/3 in this position and press regulating lever against measurement arm (arrow).

Continue: J18/1 Fig.: J17/2



KMK02297

ADJUSTING STOP/REGULATING LEVER

* Special version A

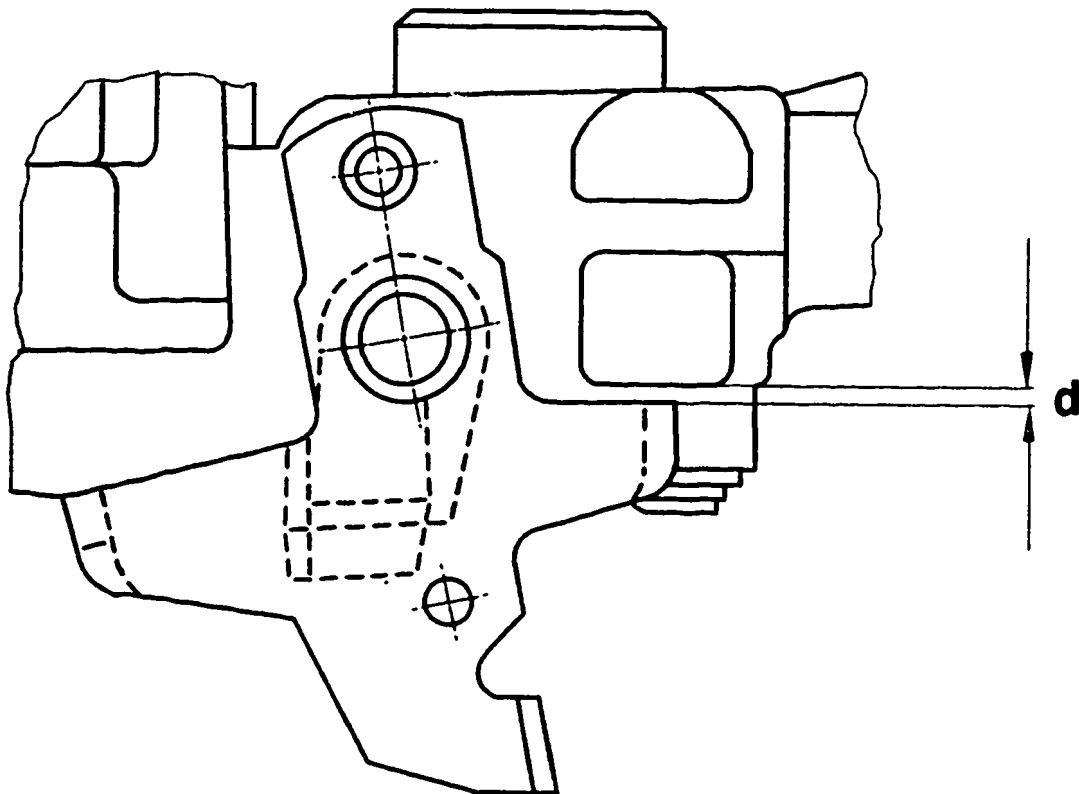
Position stop lever on setting shaft such that dimension "d" between lever and housing stop is max. 2.0 mm.

Should dimension not be attained, slightly reduce dimension "b" = 20.3 mm.

Engage spring.

Press lever in direction of housing stop and simultaneously tighten hexagon nut on setting shaft to tightening torque of 5...10 Nm.

Continue: J26/1 Fig.: J18/2



KMK02299

ADJUSTING STOP/REGULATING LEVER

* Special version B

1 = Measurement tool

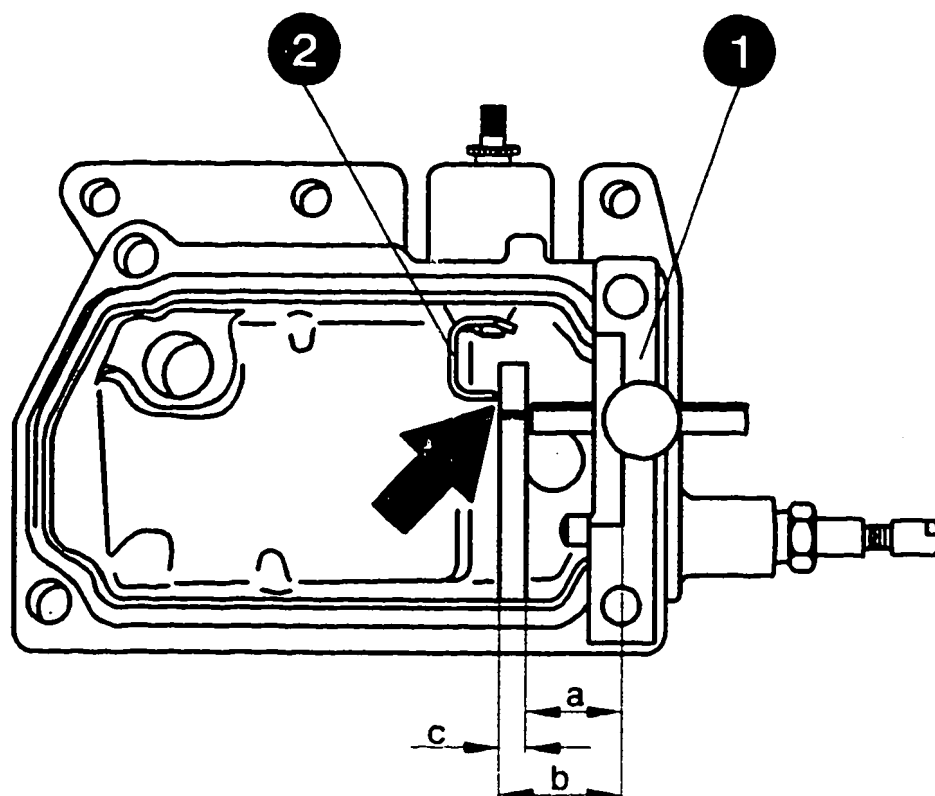
2 = Regulating lever

Attach KDEP 1152/3 to housing cover;
determine and note down dimension "c"
(thickness of measurement arm).

Calculate dimension "a" ($a = b - c$)
and set measurement arm to this
dimension.

Dimension "b" = 20.3 mm

Continue: J20/1 Fig.: J19/2



KMK02297

ADJUSTING STOP/REGULATING LEVER

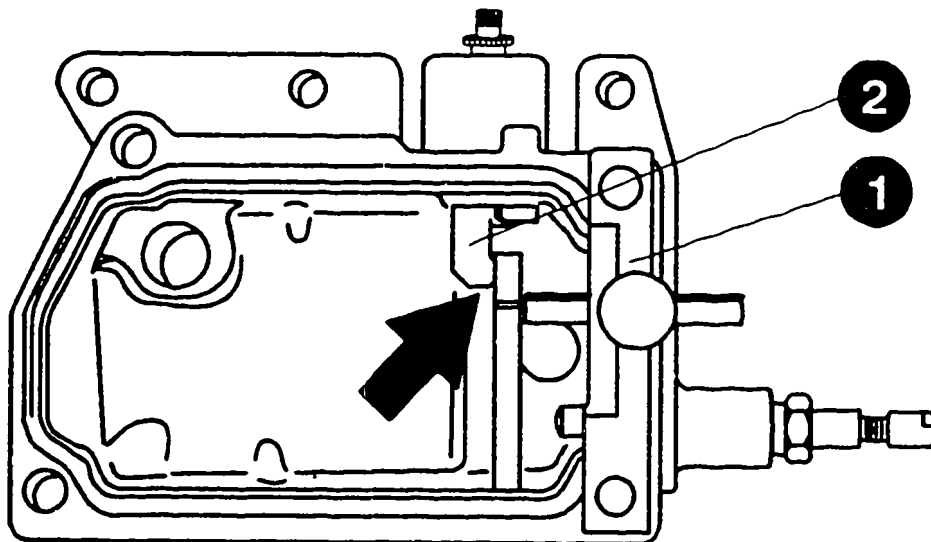
* Special version B

1 = Measurement tool

2 = Regulating lever

Clamp measurement tool KDEP 1152/3 in this position and press regulating lever against measurement arm (arrow).

Continue: J21/1 Fig.: J20/2



KMK02300

ADJUSTING STOP/REGULATING LEVER

* Special version B

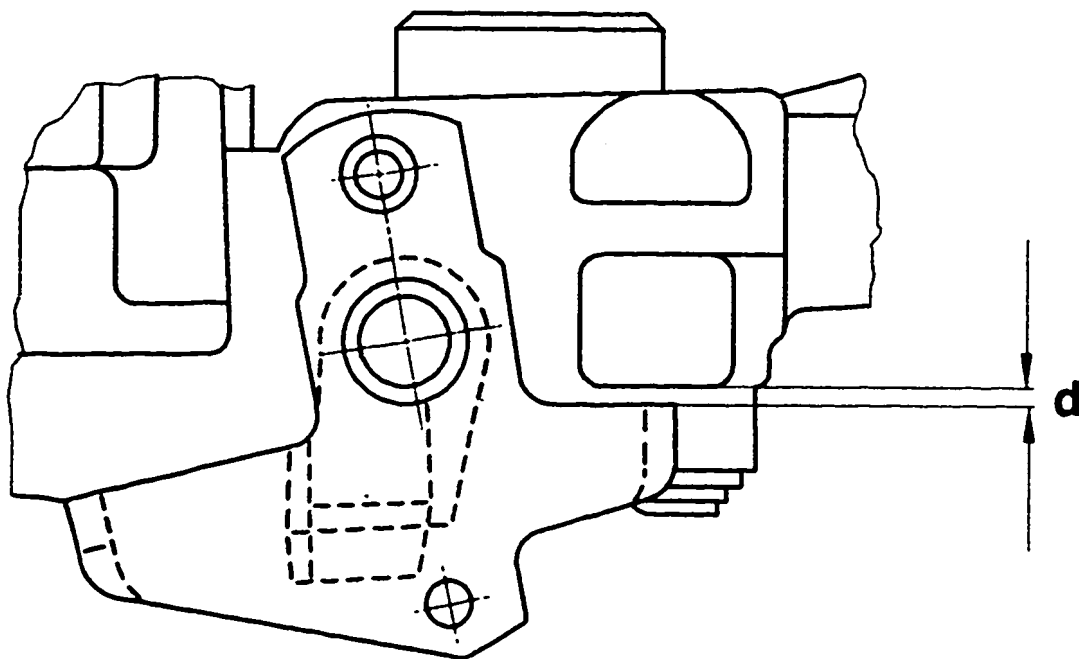
Position stop lever on setting shaft such tht dimension "d" between lever and housing stop is max. 2.0 mm.

If dimension is not attained, slightly reduce dimension "b" = 20.3 mm.

Engage spring.

Press lever in direction of housing stop and simultaneously tighten hexagon nut on setting shaft to tightening torque of 5...10 Nm.

Continue: J26/1 Fig.: J21/2



KMK02301

ADJUSTING STOP/REGULATING LEVER

* With negative torque control

1 = Measurement tool

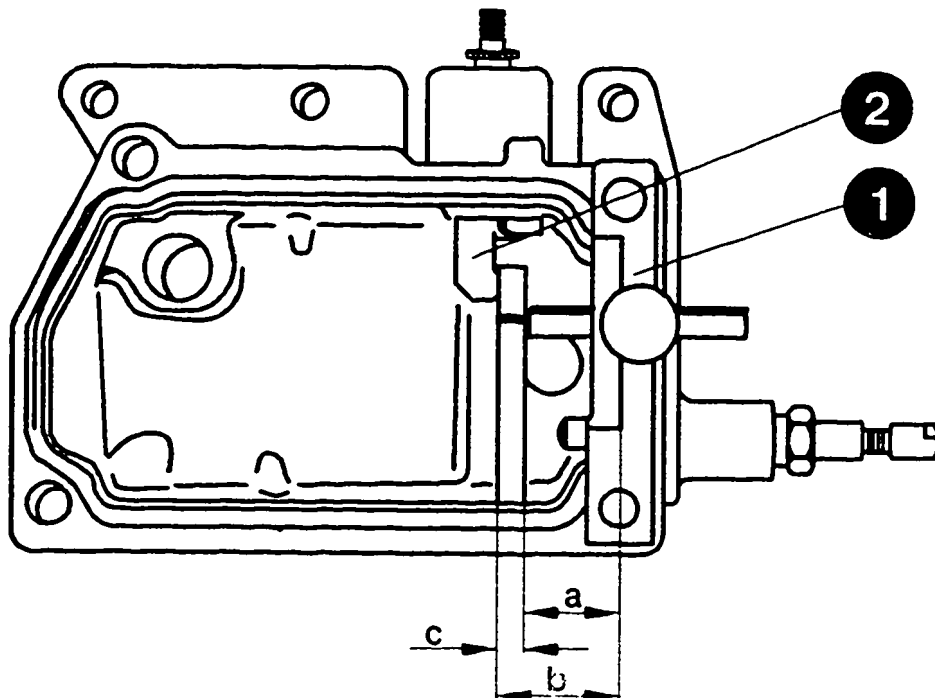
2 = Regulating lever

Attach KDEP 1152/3 to housing cover;
determine and note down dimension "c"
(thickness of measurement arm).

Calculate dimension "a" ($a = b - c$)
and adjust measurement arm to this
dimension.

Dimension "b" = 28.8 mm

Continue: J23/1 Fig.: J22/2



KMK02296

ADJUSTING STOP/REGULATING LEVER

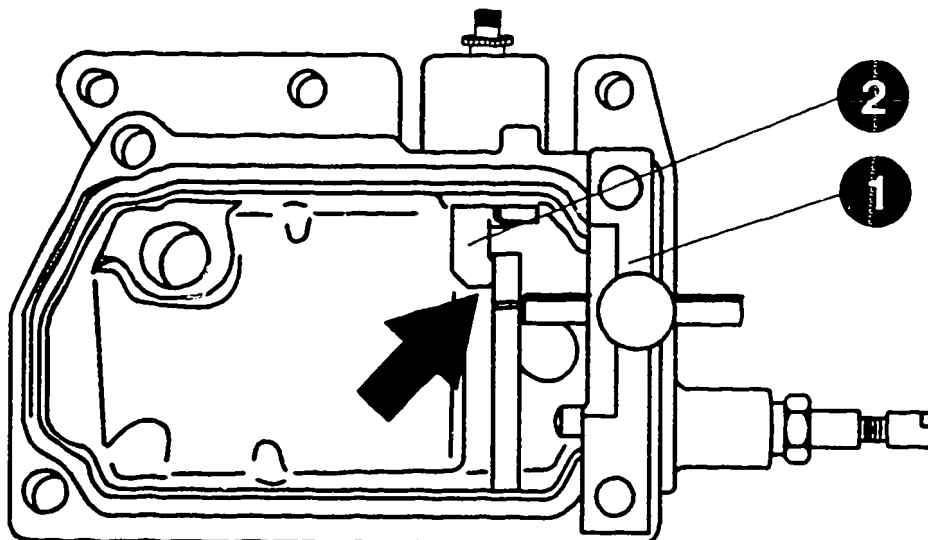
* With negative torque control

1 = Measurement tool

2 = Regulating lever

Clamp measurement tool KDEP 1152/3 in this position and press regulating lever against measurement arm (arrow).

Continue: J24/1 Fig.: J23/2



KMK02300

ADJUSTING STOP/REGULATING LEVER

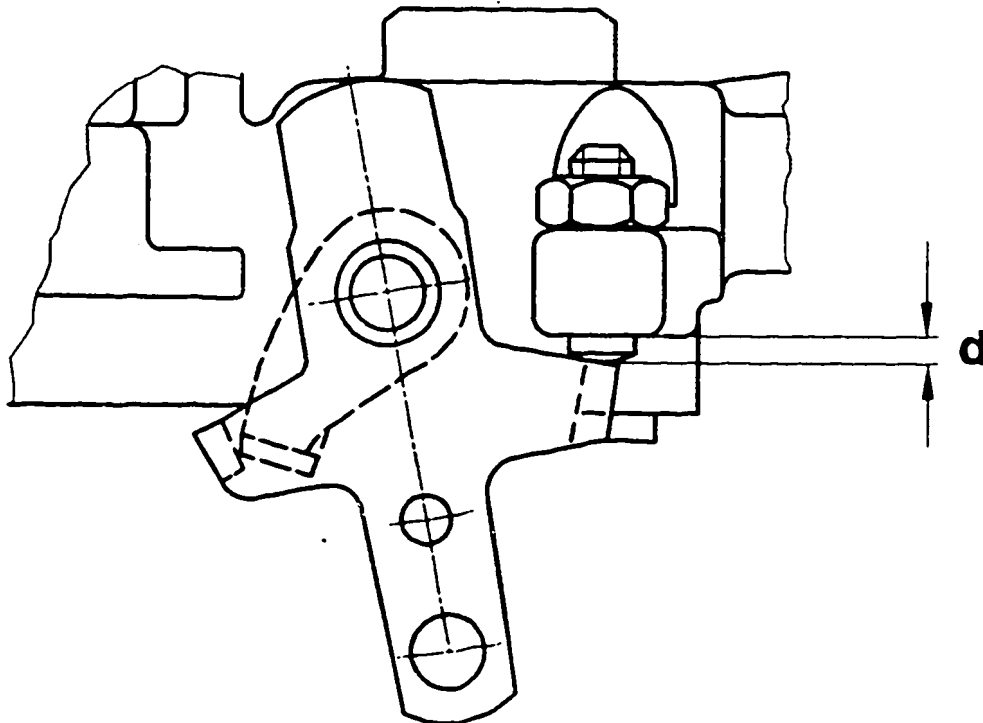
* With negative torque control

Position stop lever on setting-shaft tooting such that dimension "d" between lever and housing stop is as small as possible.

Engage spring.

Press stop lever in direction of housing stop and simultaneously tighten hexagon nut on setting shaft. Tightening torque 5...10 Nm.

Continue: J25/1 Fig.: J24/2



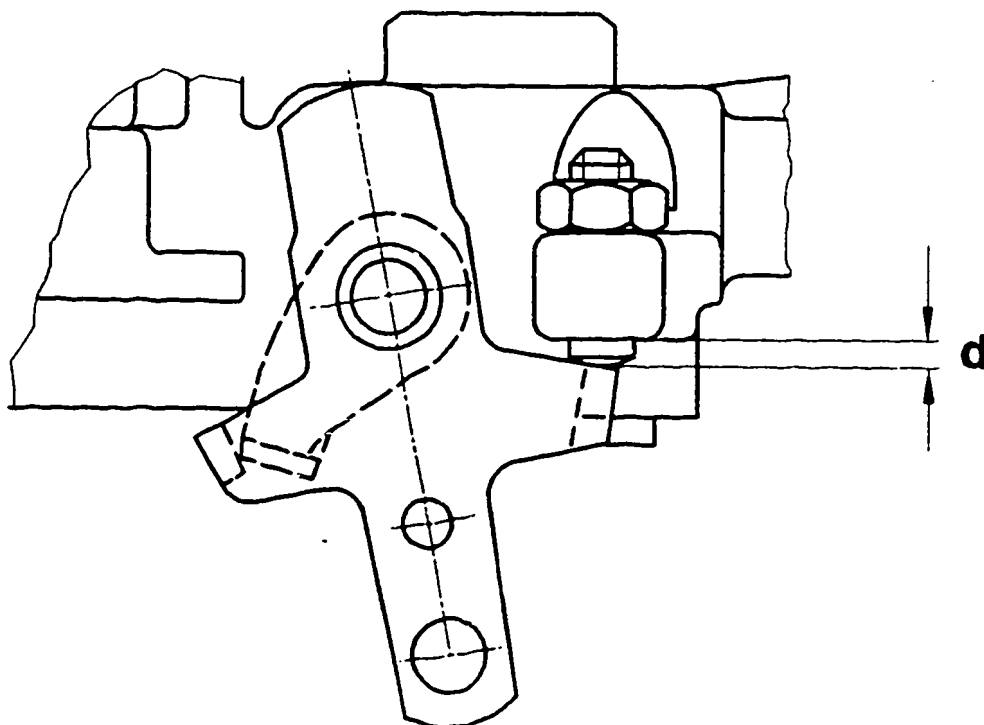
KMK02302

ADJUSTING STOP/REGULATING LEVER

* With negative torque control

Close stop screw on stop lever
(dimension "d") and tighten lock nut
to tightening torque of 6...9 Nm.

Continue: J26/1 Fig.: J25/2



KMK02302

ADJUSTING POSITION OF DISTRIBUTOR-PUMP PLUNGER

Select adjustment in line with
following characteristics:

* Distributor-type pump without
prestroke

Dimension "K" adjustment J27/1

* Quiet-running facility

Dimension "K1" adjustment K03/1

Data in test-specification sheet
under remarks

* Prestroke adjustment K09/1.
Data in test-specification sheet

Continue: J27/1

ADJUSTING POSITION OF DISTRIBUTOR-PUMP PLUNGER:

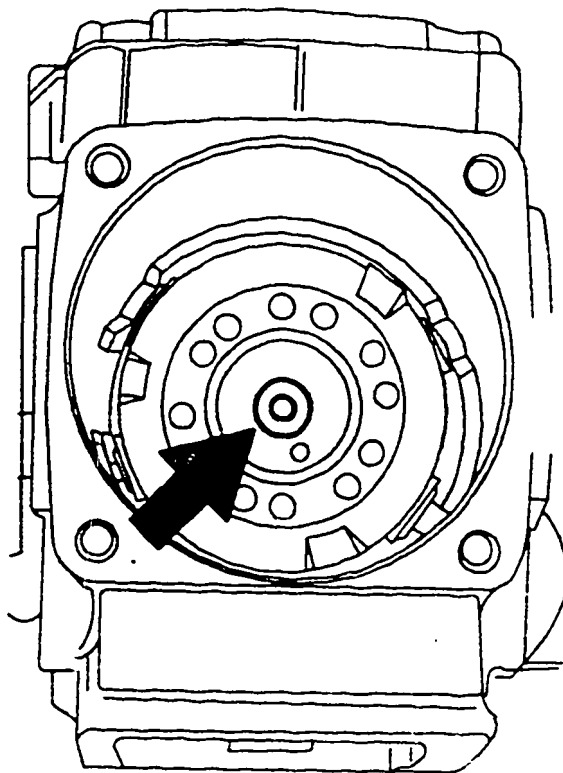
Arrow = Shim

Distributor-type pump without
prestroke:

Dimension "K" is determined with
KDEP 1088. Refer to data, dimension
"K" in test-specification sheet.
Insert arbitrary shim (dry) in base of
plunger: do not stick on with grease
or the like.

Continue: J28/1 Fig.: J27/2

KMK03417



ADJUSTING POSITION OF DISTRIBUTOR-PUMP PLUNGER:

- 1 = Shim
- 2 = Base of distributor pump plunger
- 3 = Compression spring

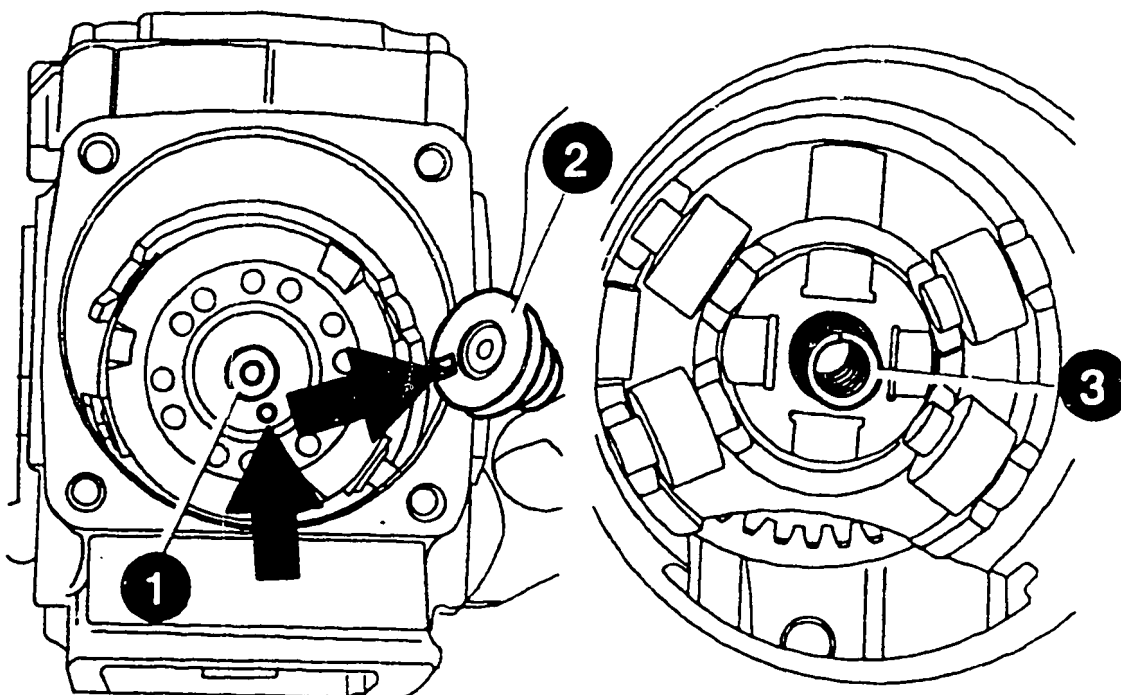
NOTE

If compression spring is provided, it is not to be fitted.

Insert distributor-pump plunger with shim into cam plate such that driver pin of cam plate enters recess in bottom of plunger (arrows).

Continue: J29/1 Fig.: J28/2

KMK03418



ADJUSTING POSITION OF DISTRIBUTOR-PUMP PLUNGER

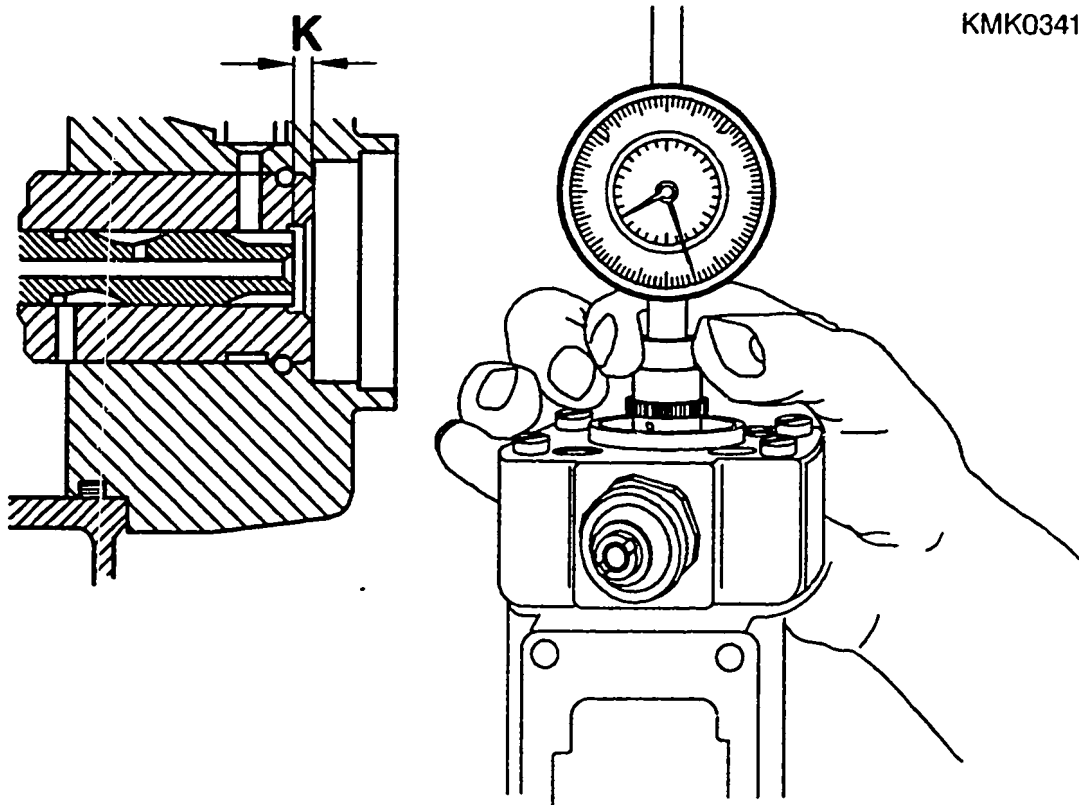
Insert distributor head carefully and without tilting over distributor-pump plunger into housing and secure with screws.

DETERMINING PLUNGER DIMENSION (Dimension "K")

Dimension "K" is the distance between the end-face sealing surface of the distributor head and the end face of the distributor-pump plunger.

Move distributor-pump plunger to UT position.

Continue: K02/1 Fig.: K01/2



ADJUSTING POSITION OF DISTRIBUTOR-PUMP PLUNGER:

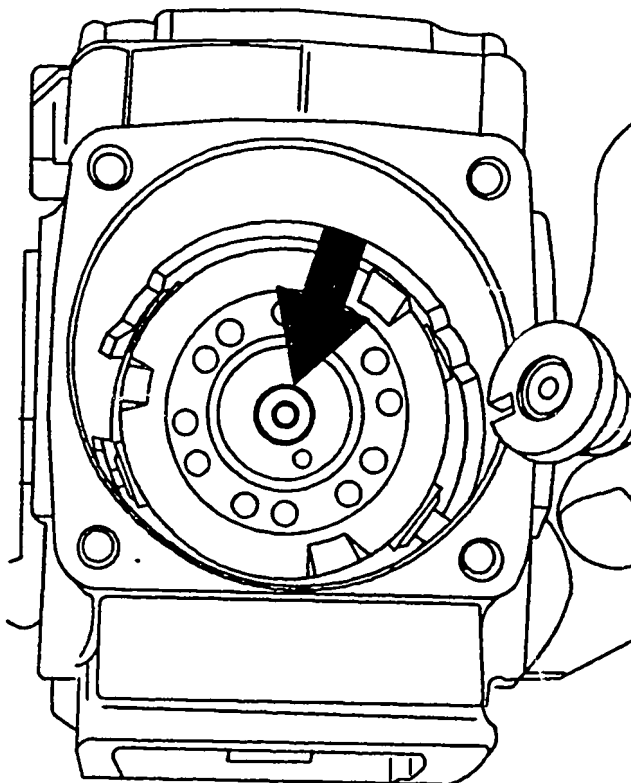
Determining dimension "K"

Compare measured dimension (red dial-indicator numbers) to desired dimension "K" given in test-specification sheet and effect compensation with appropriate shim (arrow) in bottom of plunger.

If the measured dimension is greater than the prescribed desired dimension "K", a thicker shim must be fitted; a thinner shim is required if the situation is vice-versa. Then re-check dimension "K".

Continue: K22/1 Fig.: K02/2

KMK03420



ADJUSTING QUIET-RUNNING FACILITY

DETERMINING DIMENSION "K1"

The previous dimension to be set, namely "K", is superseded on these pumps by the dimension "K1". There are then neither data under dimension "k" nor under "prestroke" in the test-specification sheet. The dimension "K1" is therefore marked beneath the solenoid valve in the distributor head (arrow).

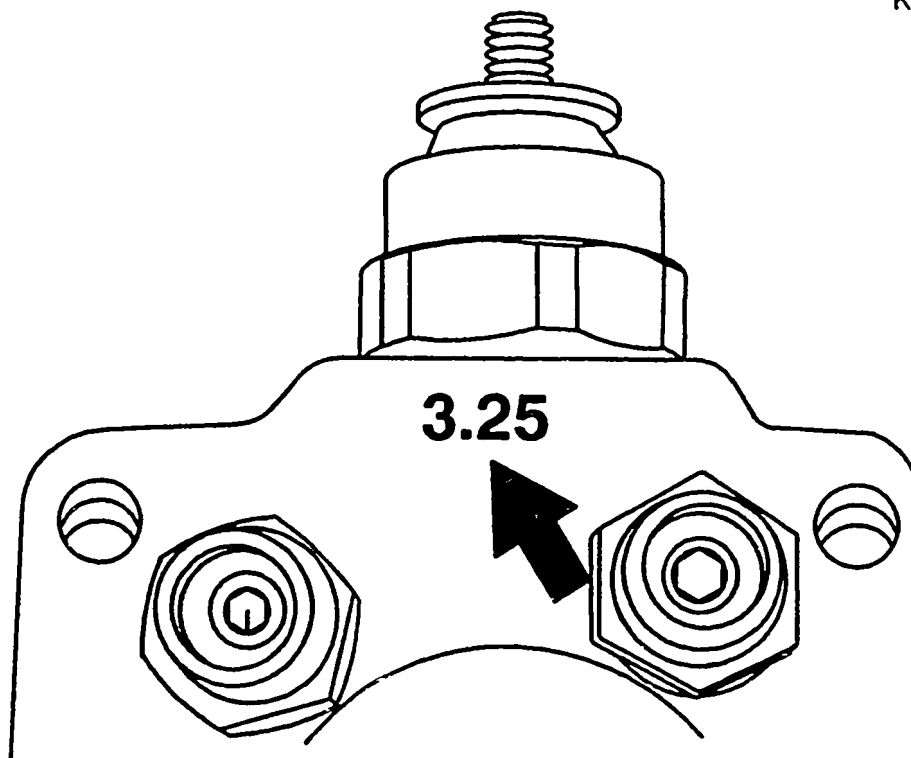
EXAMPLE

Marked number = 3.25

DIMENSION "K1" = 3.25 mm

Continue: K04/1 Fig.: K03/2

KMK03421



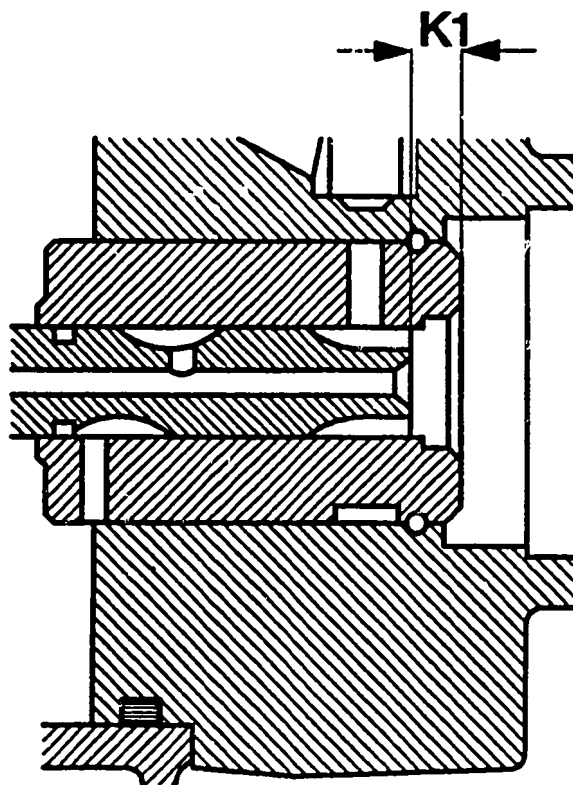
ADJUSTING QUIET-RUNNING FACILITY

DETERMINING DIMENSION "K1"

The dimension "K1" is the distance between the end-face sealing surface of the distributor head and the end face of the distributor-pump plunger.

Move distributor-pump plunger to UT position.

Continue: K05/1 Fig.: K04/2



KMK03422

ADJUSTING QUIET-RUNNING FACILITY

DETERMINING DIMENSION "K1"

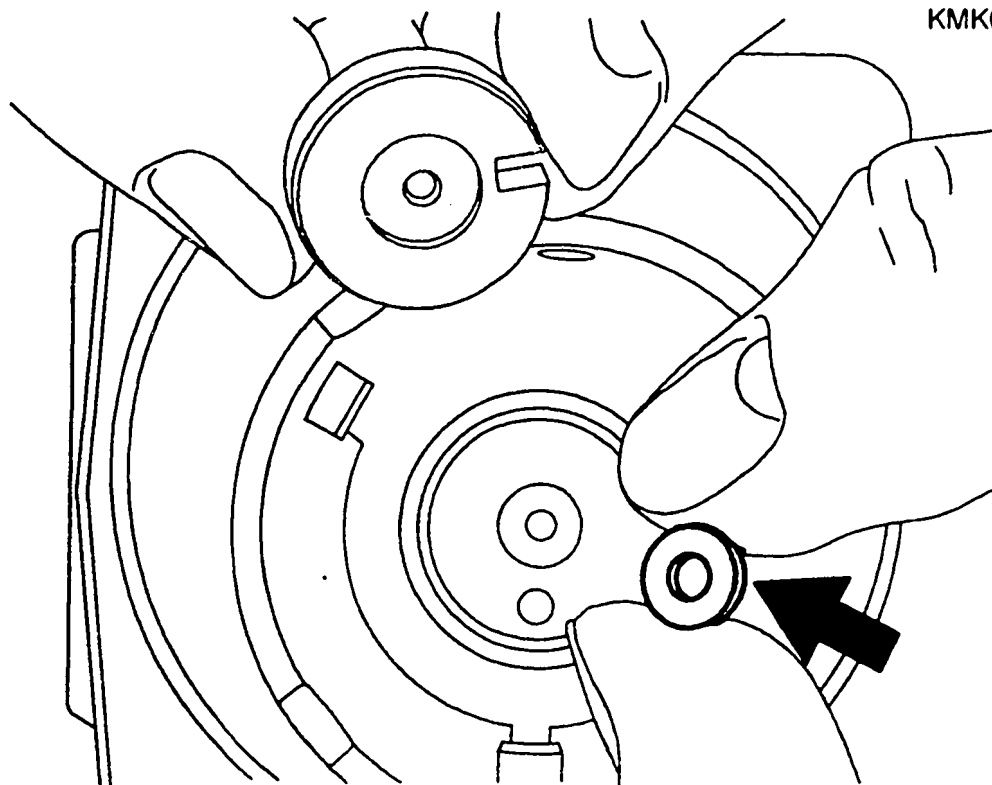
Arrow = Shim

Insert any shim (dry) in base of plunger. Do not bond on with grease or the like.

Note:

If there is a compression spring beneath the cam plate, it is not to be fitted.

Continue: K06/1 Fig.: K05/2



ADJUSTING QUIET-RUNNING FACILITY

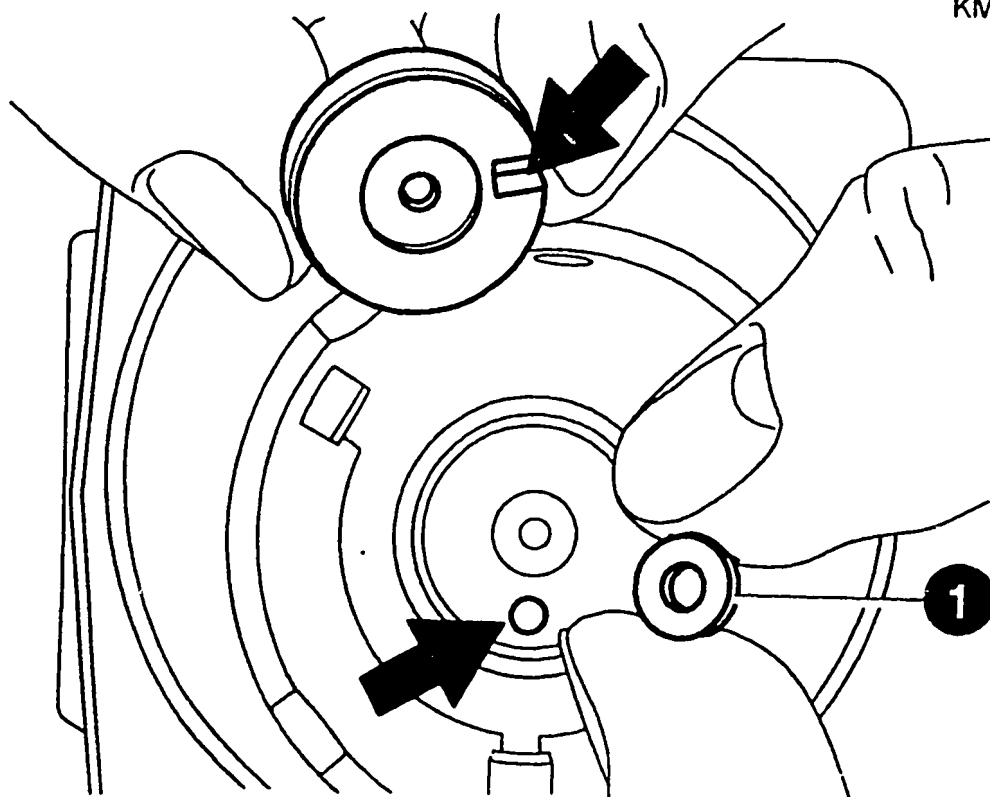
1 = Shim

DETERMINING DIMENSION "K1"

Insert distributor-pump plunger with shim in cam plate such that driver pin of cam plate enters recess at bottom of plunger (arrows).

Insert distributor head carefully and without tilting over distributor-pump housing into housing and secure with fastening screws.

Continue: K07/1 Fig.: K06/2



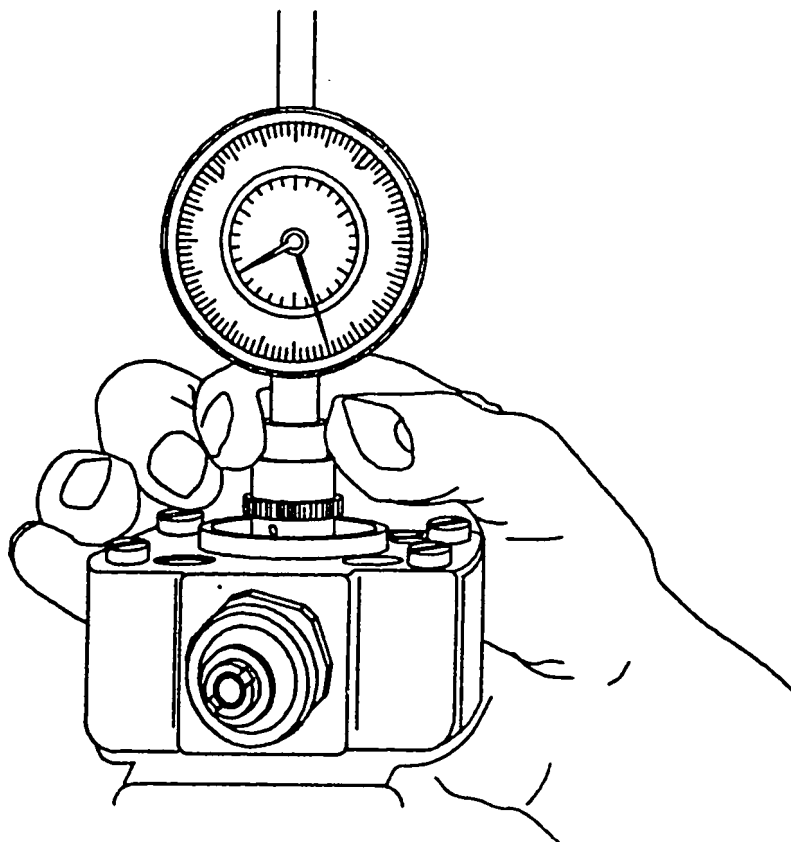
ADJUSTING QUIET-RUNNING FACILITY

DETERMINING DIMENSION "K1"

The dimension "K1" is measured with KDEP 1088.

Compare measured dimension (red dial-indicator numbers) to desired dimension "K1" marked in distributor head and effect compensation with appropriate shim in bottom of plunger.

Continue: K08/1 Fig.: K07/2



KMK03425

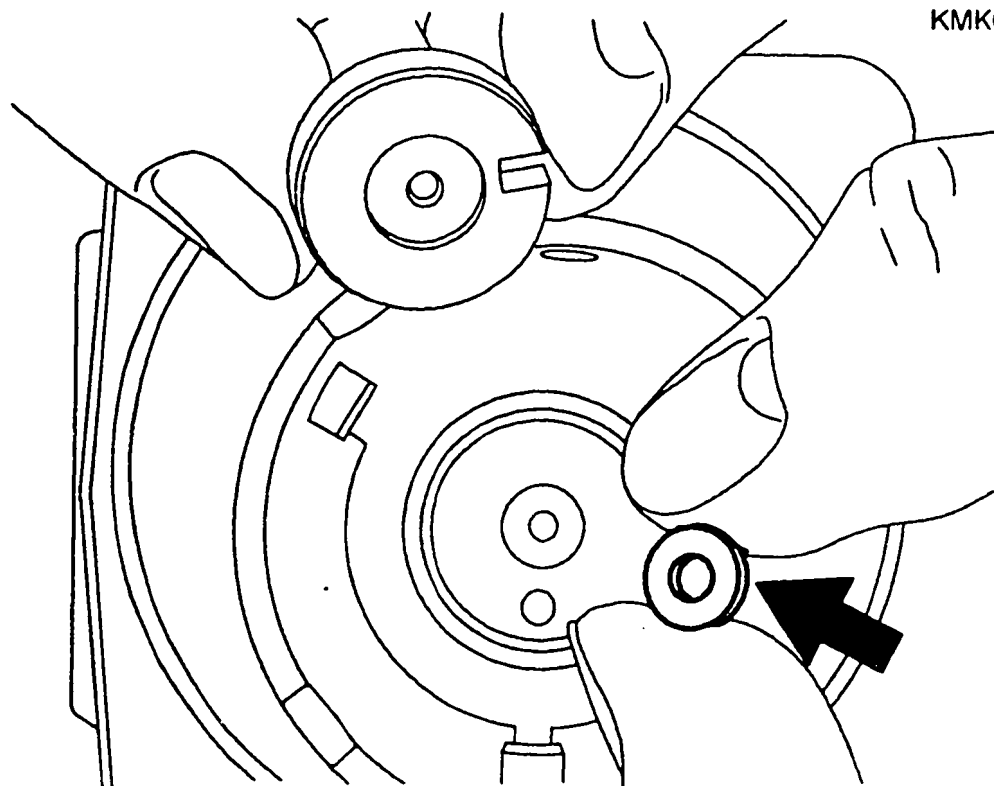
ADJUSTING QUIET-RUNNING FACILITY

Arrow = Shim

DETERMINING DIMENSION "K1"

If the measured dimension is greater than the prescribed desired dimension "K1" a thinner shim must be added. Then re-check dimension "K1".

Continue: K22/1 Fig.: K08/2



KMK03423

ADJUSTING PRESTROKE

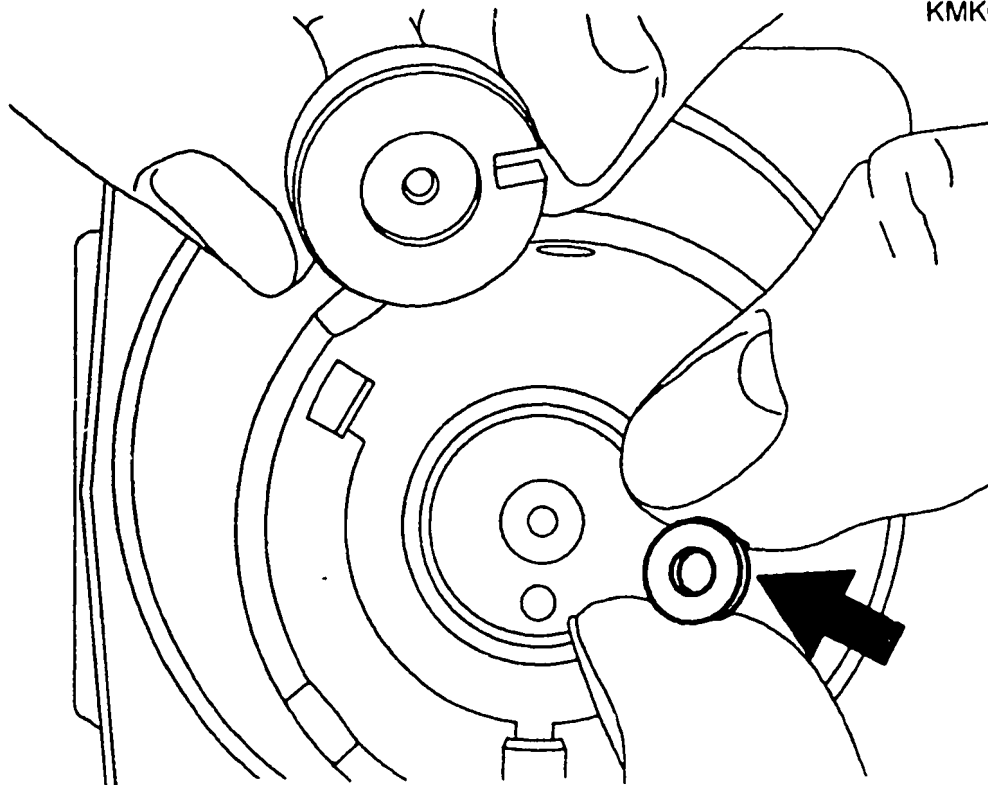
1 = Shim

Refer to test-specification
sheet for data

The measurement is performed
hydraulically on the test bench.
Insert any shim (dry)
in bottom of plunger.
Do not bond on with grease or the like.

Note:
If there is a compression spring,
it is not to be installed!

Continue: K10/1 Fig.: K09/2



KMK03423

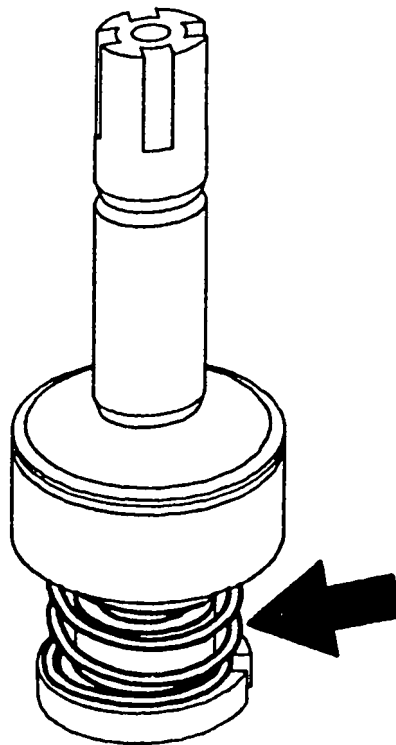
ADJUSTING PRESTROKE

Insert distributor-pump plunger with shim into cam plate such that driver pin of cam plate enters recess in bottom of plunger.

There must be an auxiliary compression spring (arrow) fitted between bottom of plunger and spool to ensure that spool is always pressed against distributor head during measurement. Position spool on plunger.

Continue: K11/1 Fig.: K10/2

KMK03426



ADJUSTING PRESTROKE

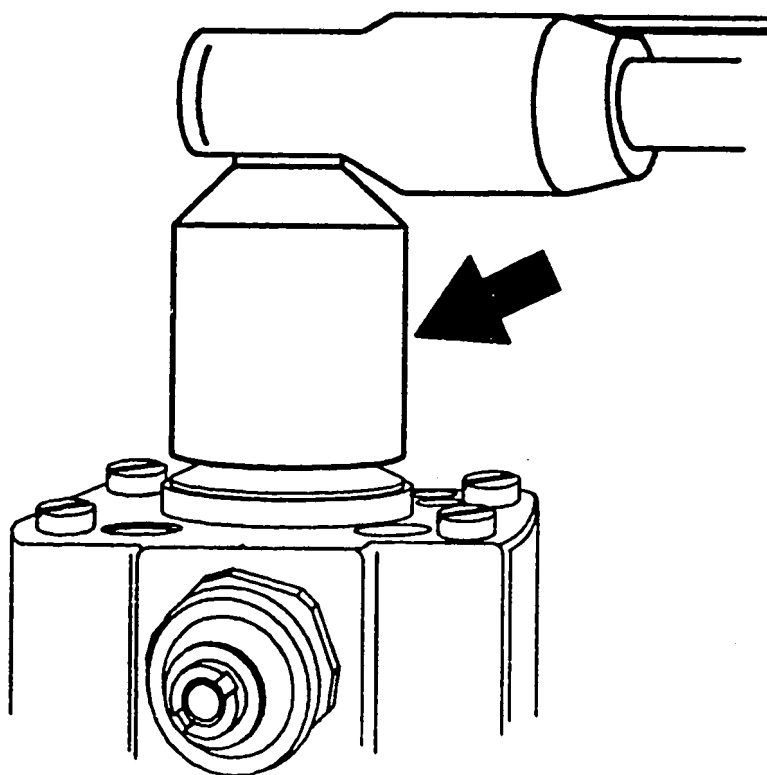
Insert distributor head carefully and without tilting over distributor-pump plunger into housing and secure with screws.

Screw NEW central screw plug with seal ring into distributor head with wrench KDEP 1080.

Tightening torque 60 ... 80 Nm

Continue: K12/1 Fig.: K11/2

KMK03427



ADJUSTING PRESTROKE

* Installing delivery-valve assemblies

- 1 = Gasket
- 2 = Delivery-valve assembly
- 3 = Delivery-valve spring
- 4 = Shim
- 5 = Delivery-valve holder

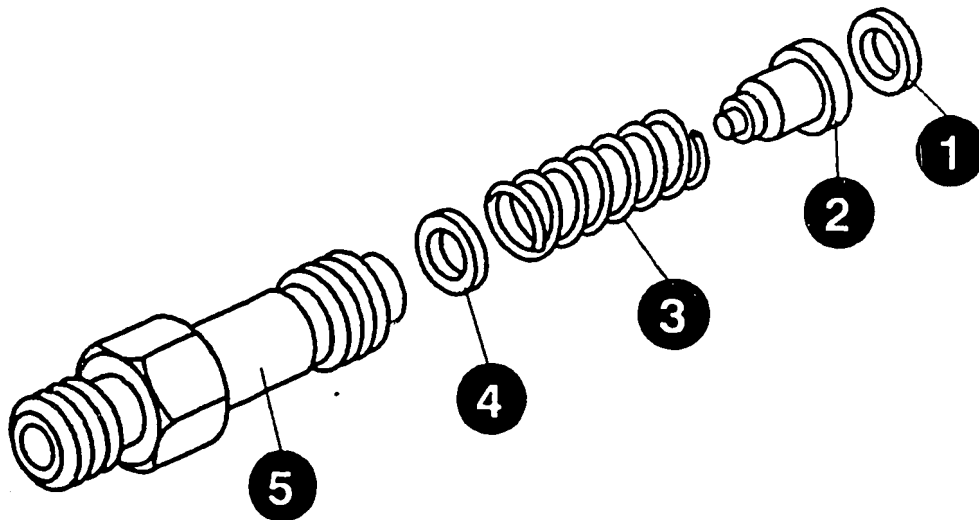
Install delivery-valve assembly with gasket, delivery-valve spring, shim and fitting in distributor head.

The tightening torque for delivery-valve holders already used is:

38 ... 48 Nm.

Continue: K13/1 Fig.: K12/2

KMK03428



ADJUSTING PRESTROKE

* Installing delivery-valve assemblies
The tightening torque for new
delivery-valve holders screwed into a
new distributor head is: 38 ... 48 Nm.

Removed (deformed) delivery-valve
holders may only be re-used if:

- * Sealing edge not damaged, cracked or
chipped
- * Bezel at sealing edge only slightly
deformed without visible shoulder
- * Valve holders are not siezed in
position in delivery-valve holders

Continue: K13/2

ADJUSTING PRESTROKE

Provisionally screw governor shaft
with O-ring and slotted shoulder
screws (as per service-parts list)
into housing with flat seal ring.
Provisionally fit assembled housing
cover with fillister-head screws.

Seal open tapped holes in housing
cover with screw plugs.

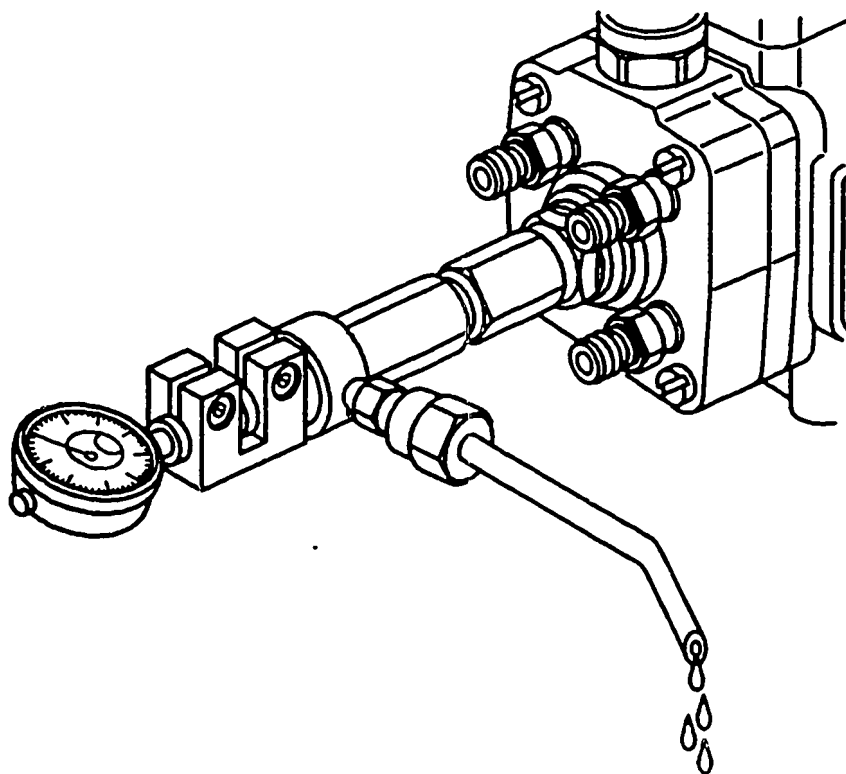
Continue: K14/1

ADJUSTING PRESTROKE

Screw prestroke measuring device (1 688 130 180) and dial indicator 1 687 233 012 into central screw plug. Initially tension dial indicator 4 mm in UT position of distributor-pump plunger.

Unclamp distributor-type fuel-injection pump from clamping support and clamp it to clamping bracket of injection-pump test bench.

Continue: K15/1 Fig.: K14/2



KMK03429

ADJUSTING PRESTROKE

NOTE:

Do not swivel VE pump into horizontal position with prestroke measuring device fitted as otherwise there would be a danger of prestroke disk and rollers falling out.
Attach drive coupling.

Continue: K15/2

ADJUSTING PRESTROKE

Attach distributor-type fuel-injection pump to test bench such that coupling is subjected to tensile stress.
In other words secure drive coupling of distributor-type fuel-injection pump in no-play coupling of test bench.
Loosen fastening screw of clamping bracket and pull bracket with clamped-on pump away from drive.
Tighten fastening screw at the same time.

Continue: K16/1

ADJUSTING PRESTROKE

Connect up calibrating-oil inlet hose.
Connect up solenoid valve (pulling
electromagnet) to voltage source 12/24
V (0 V with pushing electromagnet).
Switch on injection-pump test bench
and set inlet pressure of 400 hPa.
Turn distributor-pump plunger to UT
position and set dial indicator to "0"
(calibrating oil emerges at overflow
pipe of measuring device).

Continue: K16/2

ADJUSTING PRESTROKE

Slowly turn drive shaft in direction
of rotation until start of delivery is
attained.

Start of delivery has been attained if
1 drop per second flows out at
overflow pipe (arrow).

For more precise measurement measure
droplets over a period of several
seconds, e.g. 15 drops in 15 seconds.

Continue: K17/1

ADJUSTING PRESTROKE

Read off measured value and compare to "prestroke setting" as per test-specification sheet.

If prestroke setting is correct, continue as per Coordinate K22/1

Correct deviation by way of appropriate shim beneath bottom of plunger.

To do so, remove distributor-type fuel-injection pump from test bench, secure in position in clamping frame, remove housing cover and distributor head.

Continue: K18/1

ADJUSTING PRESTROKE

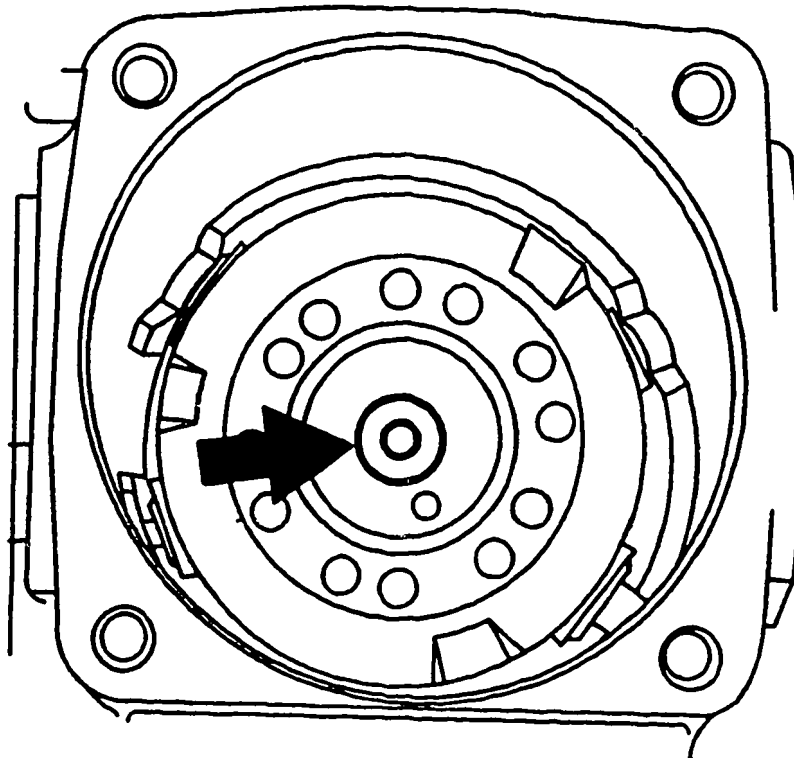
Arrow = Shim

If the prestroke is too large, insert thicker shim; insert thinner shim if prestroke is too small. If selection is such that requirement is between 2 shim thicknesses, choose thicker shim.

Re-install distributor head and housing cover and perform prestroke check measurement.

Continue: K19/1 Fig.: K18/2

KMK03430



ADJUSTING POINTER AT ADJUSTMENT WINDOW
(FOR SETTING PUMP WITH RESPECT TO
ENGINE AS PER "POINTER METHOD")

* Pump with no pointer: continue on
Coordinate K22/1

Such adjustment is to be performed
if a plunger stroke is given on the
test-specification sheet for
prestroke adjustment.

Switch off test bench following
completion of prestroke adjustment.
Do not remove fuel-injection pump.
Remove cover from adjustment window.
Turn drive shaft in direction of pump
rotation until mark on cam plate is
visible.

Continue: K20/1

ADJUSTING POINTER AT ADJUSTMENT WINDOW
(FOR SETTING PUMP WITH RESPECT TO
ENGINE AS PER "POINTER METHOD")

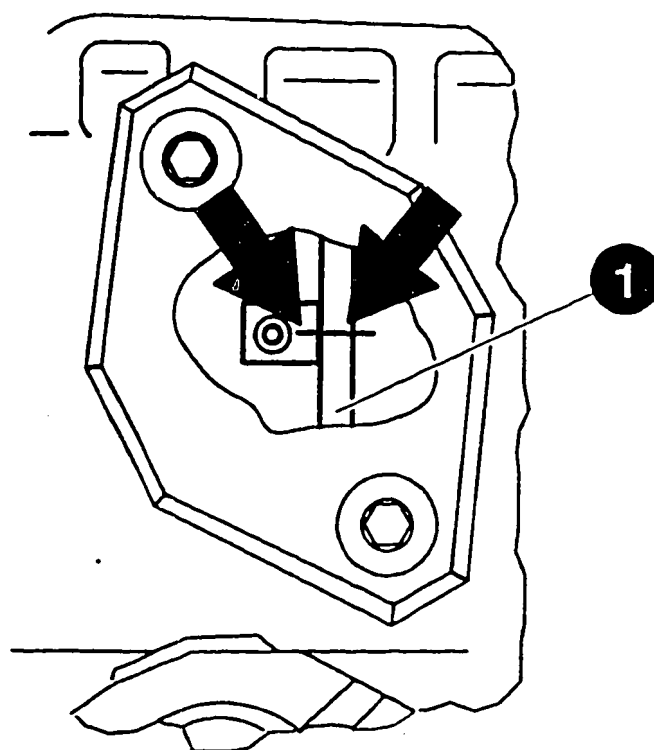
1 = Cam plate

Woodruff-key groove of drive shaft points towards delivery outlet. Slowly continue turning drive shaft until stroke as per test-specification sheet has been obtained. In this position, cause pointer to coincide with mark on cam plate (arrows).

Turn back drive shaft and cause setting to coincide.

Turn back drive shaft and check setting again.

Continue: K21/1 Fig.: K20/2



KMK03399

ADJUSTING POINTER AT ADJUSTMENT WINDOW
(FOR SETTING PUMP WITH RESPECT TO
ENGINE AS PER "POINTER METHOD")

Fit closing cover of adjustment window.
Remove prestroke measuring device and
detach fuel-injection pump from test
bench.

Continue: K22/1

INSTALLING FULCRUM LEVER ASSEMBLY

1 = Shim

2 = Compression spring

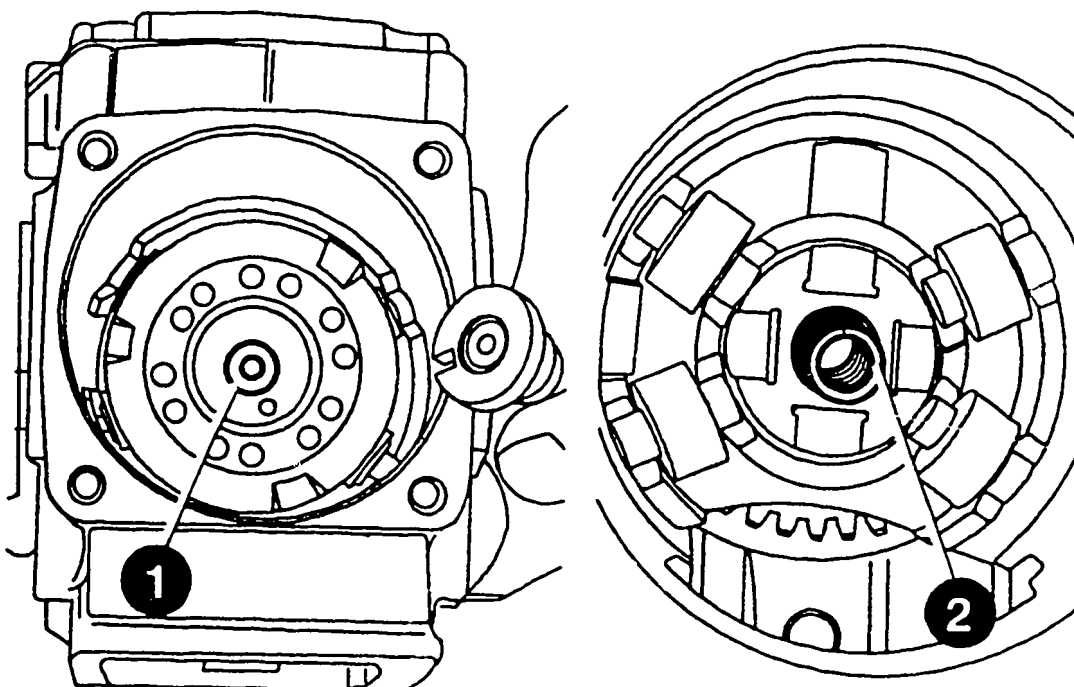
Remove drive coupling.

Remove prestroke measuring device and take out distributor head with distributor-pump plunger and calibrated shim. Check freedom of movement of distributor-pump plunger.

Unscrew housing cover, screw out governor shaft and slotted shoulder screws. If applicable, remove part-load governor. Where provided, insert compression spring between slotted washer and cam plate.

Continue: K23/1 Fig.: K22/2

KMK03431

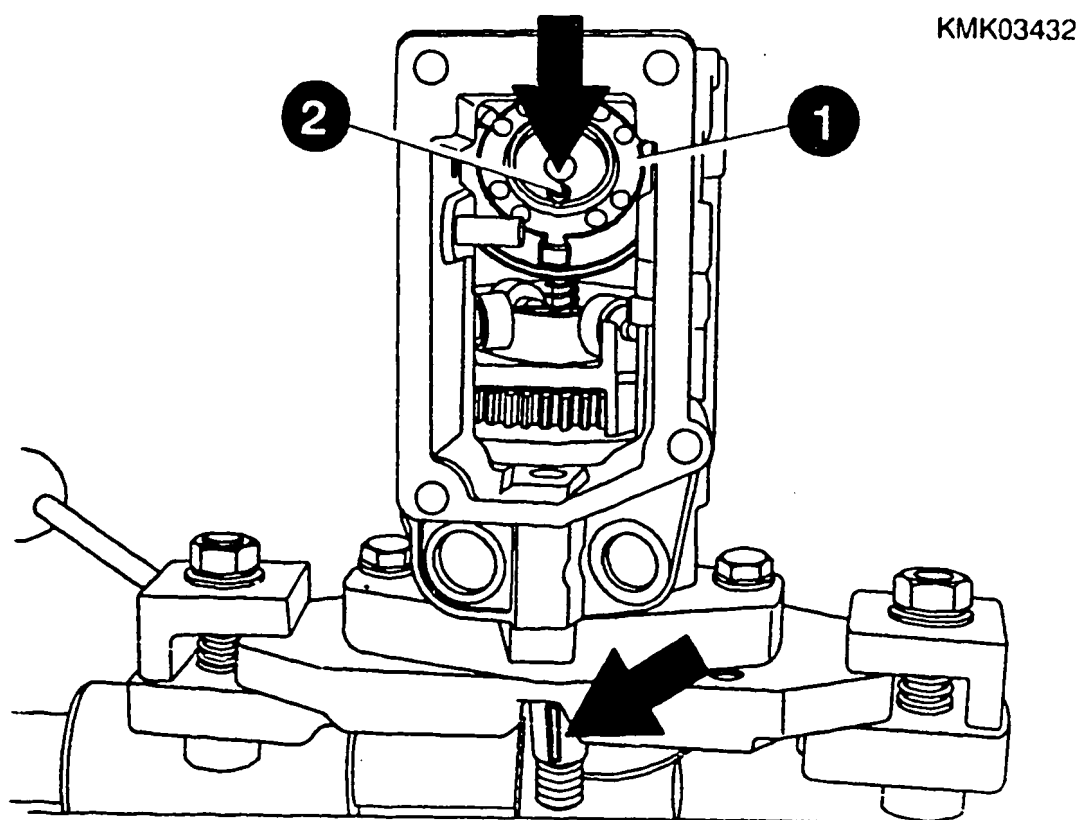


INSTALLING FULCRUM LEVER ASSEMBLY

- 1 = Cam plate
- 2 = Driver pin

Insert cam plate such that driver pin faces in direction of Woodruff-key groove (arrow) of drive shaft.

Continue: K24/1 Fig.: K23/2

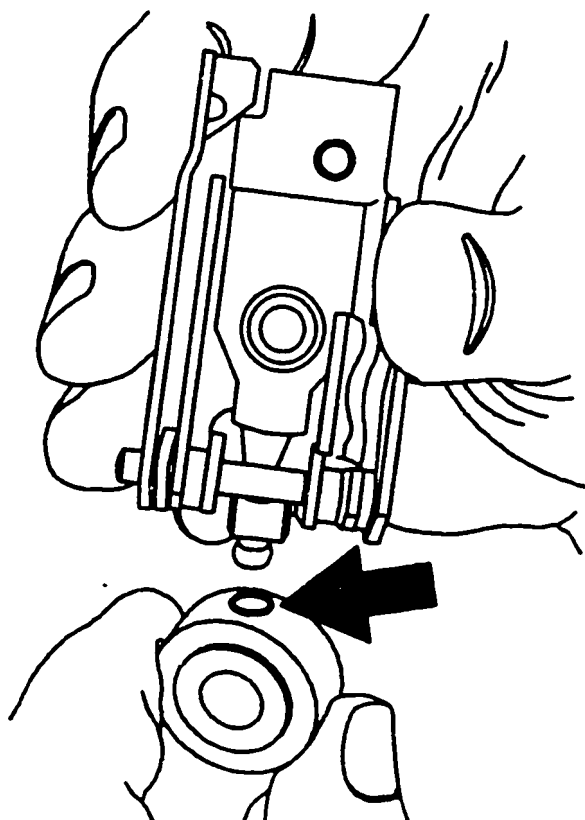


INSTALLING FULCRUM LEVER ASSEMBLY

Insert ball stud of fulcrum lever assembly in control-spool hole (arrow).

If fit is not tight or ball stud sticks, renew fulcrum lever assembly/distributor head.

Continue: K25/1 Fig.: K24/2



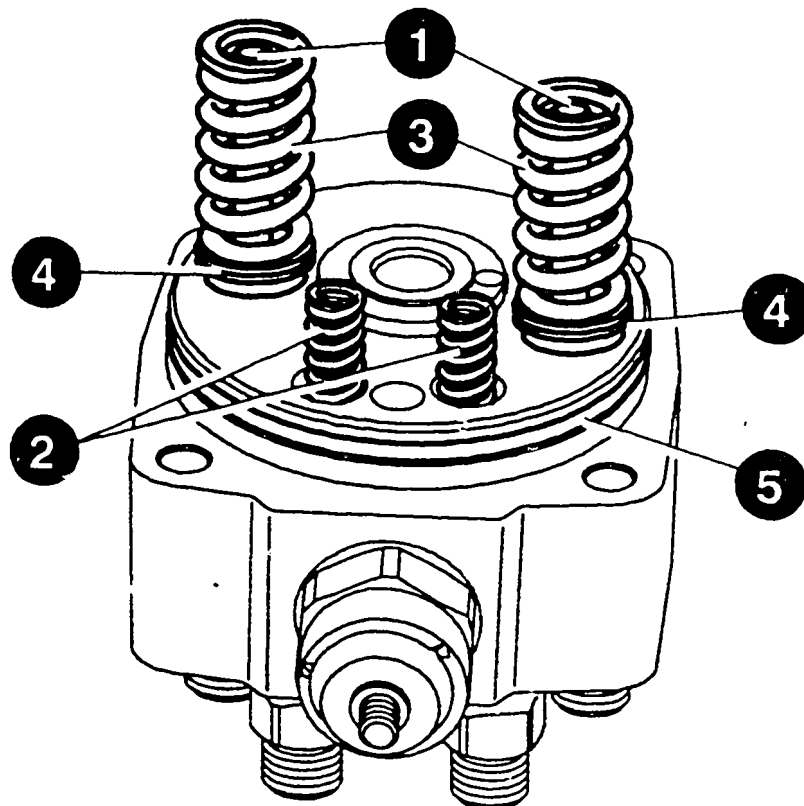
KMK03363

INSERTING DISTRIBUTOR HEAD

- 1 = Guide pins
- 2 = Compression springs
- 3 = Compression springs
- 4 = Spacers
- 5 = O-ring

Fit O-ring on distributor head. Insert guide pins, calibrated spacer (dimension KF) and spring seat with grease in distributor head. "Bond in" compression springs (small) with grease in distributor head. Attach compression spring (large) to guide pins.

Continue: K26/1 Fig.: K25/2



KMK03434

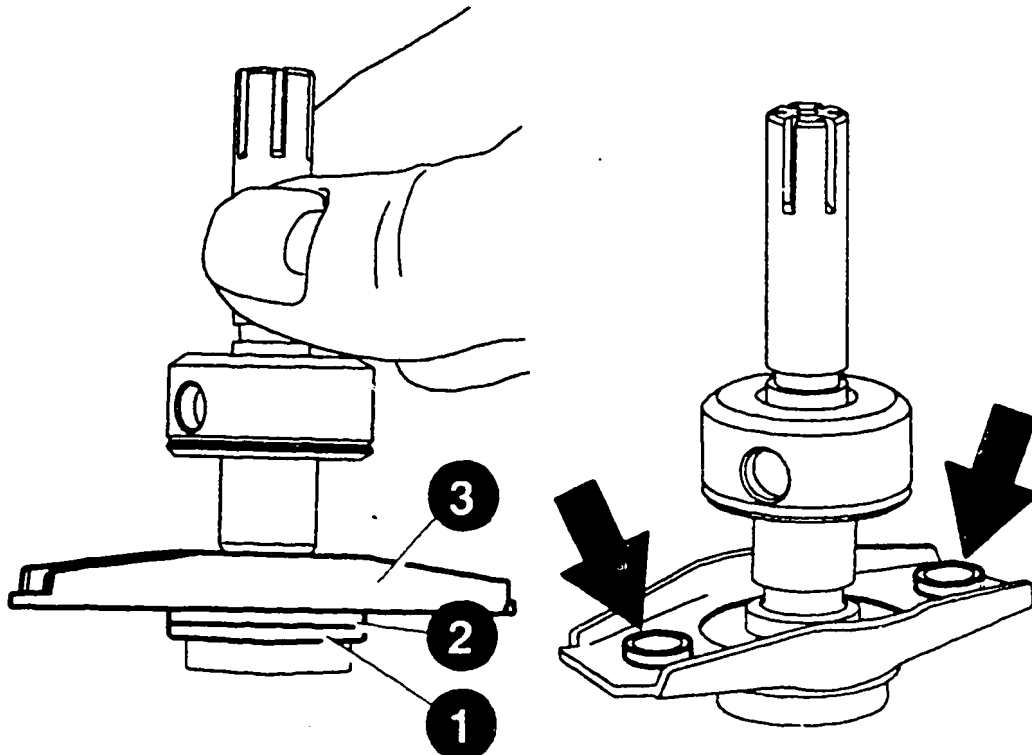
INSERTING DISTRIBUTOR HEAD

- 1 = Shim
- 2 = Slotted washer
- 3 = Spring seat

Attach shim, slotted washer and spring seat (spring guide faces upwards, arrows) to distributor-pump plunger.

Continue: K27/1 Fig.: K26/2

KMK03435

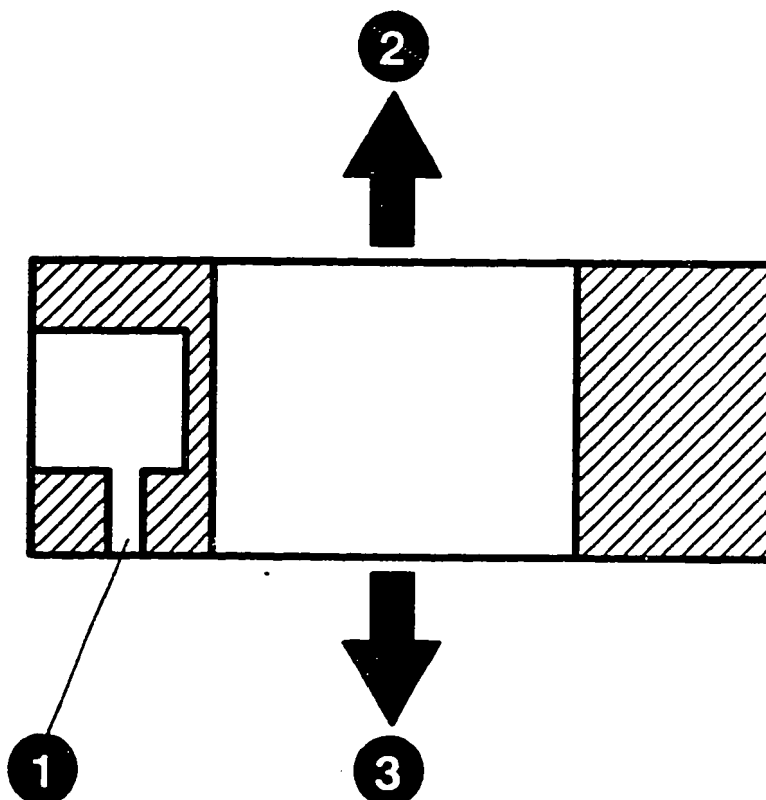


INSERTING DISTRIBUTOR HEAD

- 1 = Scavenging hole
- 2 = Distributor head side
- 3 = Cam plate side

Slip control spool onto distributor-pump plunger such that scavenging hole faces cam plate (bottom of plunger).

Continue: K28/1 Fig.: K27/2



KMK03436

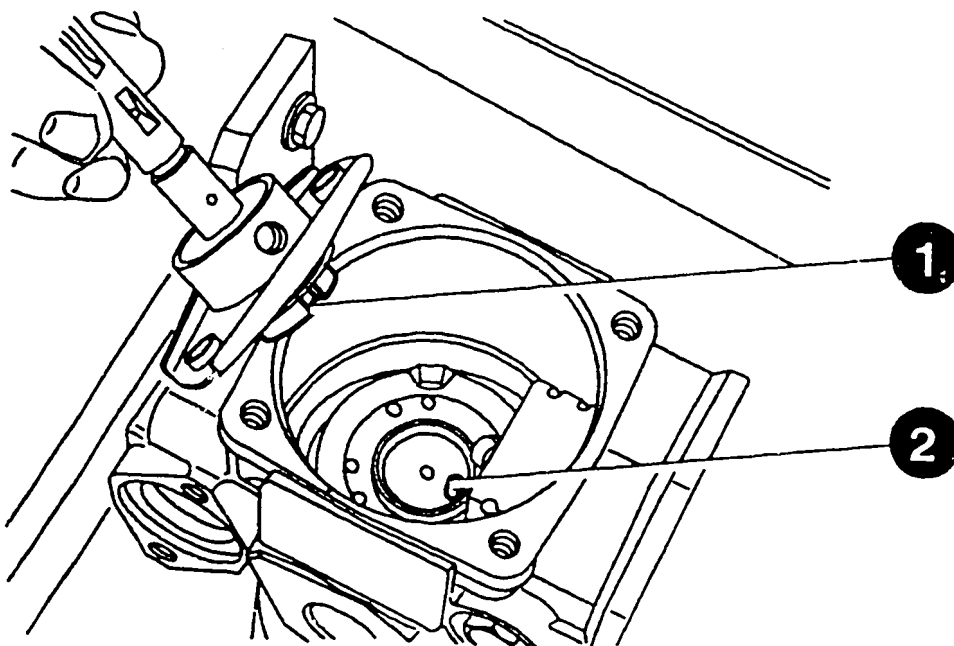
INSERTING DISTRIBUTOR HEAD

- 1 = Recess in bottom of plunger
- 2 = Driver pin

Use grease to bond in calibrated shim beneath bottom of plunger.
Insert complete distributor-pump plunger in pump housing.
Insert driver pin of cam plate into groove in distributor-pump plunger.

Continue: L01/1 Fig.: K28/2

KMK03437



INSERTING DISTRIBUTOR HEAD

- 1 = Nut
- 2 = Driver pin
- 3 = Spherical bolt
- 4 = Control-spool hole

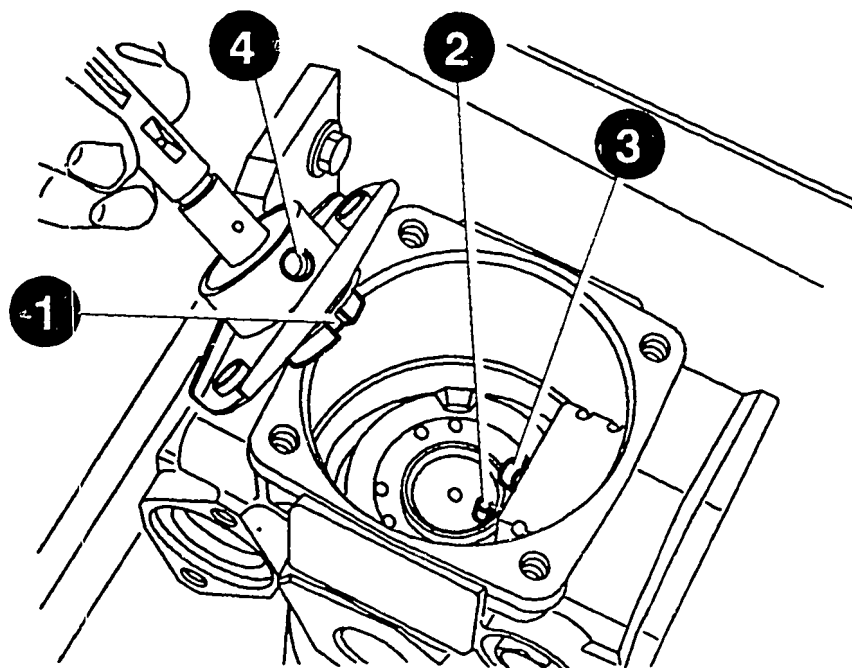
Insert spherical bolt of fulcrum lever assembly in control-spool hole.

NOTE

Driver pin and groove in distributor-pump plunger face towards housing cover.

Continue: L02/1 Fig.: L01/2

KMK03438



INSERTING DISTRIBUTOR HEAD

1 = Compression spring

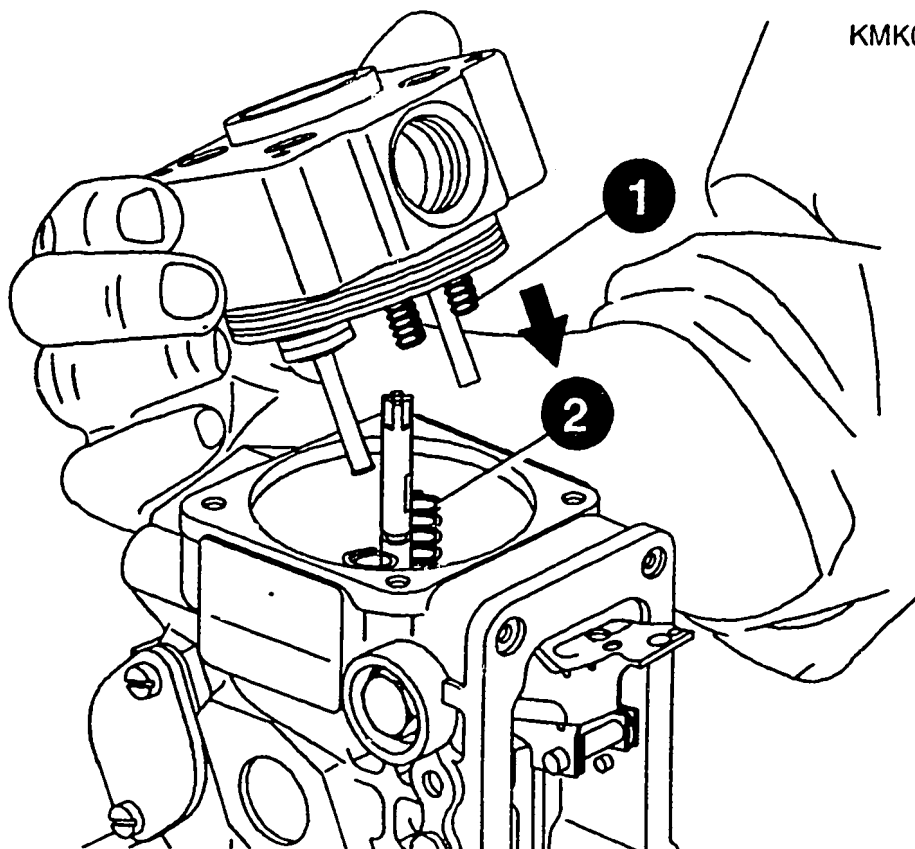
2 = Plunger springs

Position plunger springs on spring seat. Attach preassembled distributor head to pump housing.

Compression springs face fulcrum lever assembly.

Take care not to damage O-ring between pump housing and distributor head.

Continue: L03/1 Fig.: L02/2



INSERTING DISTRIBUTOR HEAD

After inserting distributor head, check whether guide pin ends are properly positioned in guide holes in spring seat.

Likewise check that spherical bolt of fulcrum lever assembly is in control-spool hole.

Continue: L04/1

INSERTING DISTRIBUTOR HEAD

Loosely insert fastening screws of distributor head as guide.

Screw fulcrum lever assembly with slotted shoulder screws (arrows) and seal ring into housing.
Tighten distributor head to prescribed tightening torque.

Fillister-head hexagon-socket-head cap screw

7...10 Nm

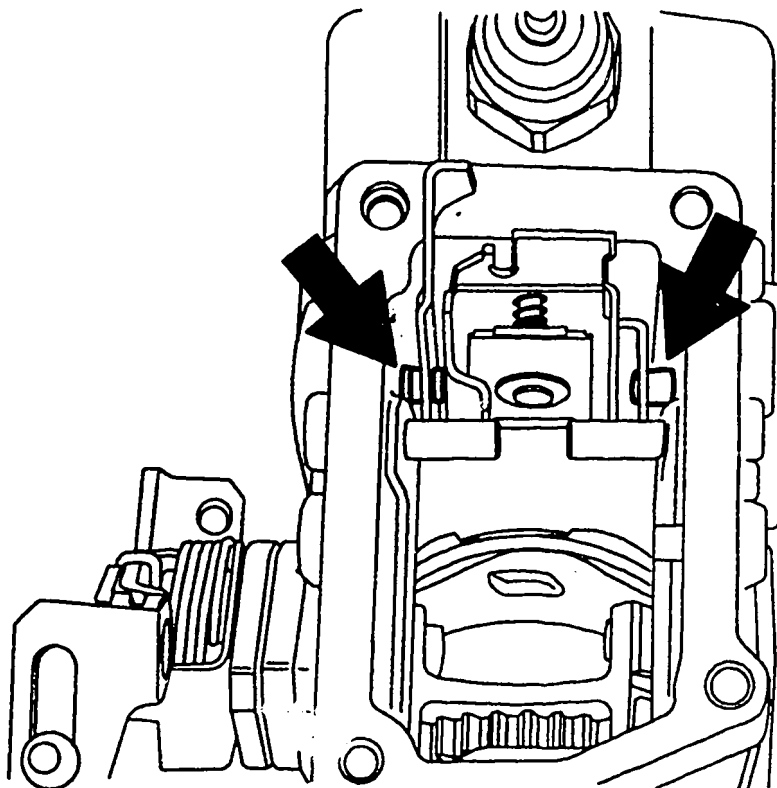
Torx bolt

10...14 Nm

Attach support plate (in the case of pump with no TAS).

Continue: L05/1 Fig.: L04/2

KMK03440



INSTALLING MECHANICAL GOVERNOR

1 = Shim plate

2 = Supporting plate

Use grease to bond shim plate and supporting plate into housing.

Assemble flyweight assembly comprising:
Flyweights, spacer and sliding sleeve
with plug.

NOTE

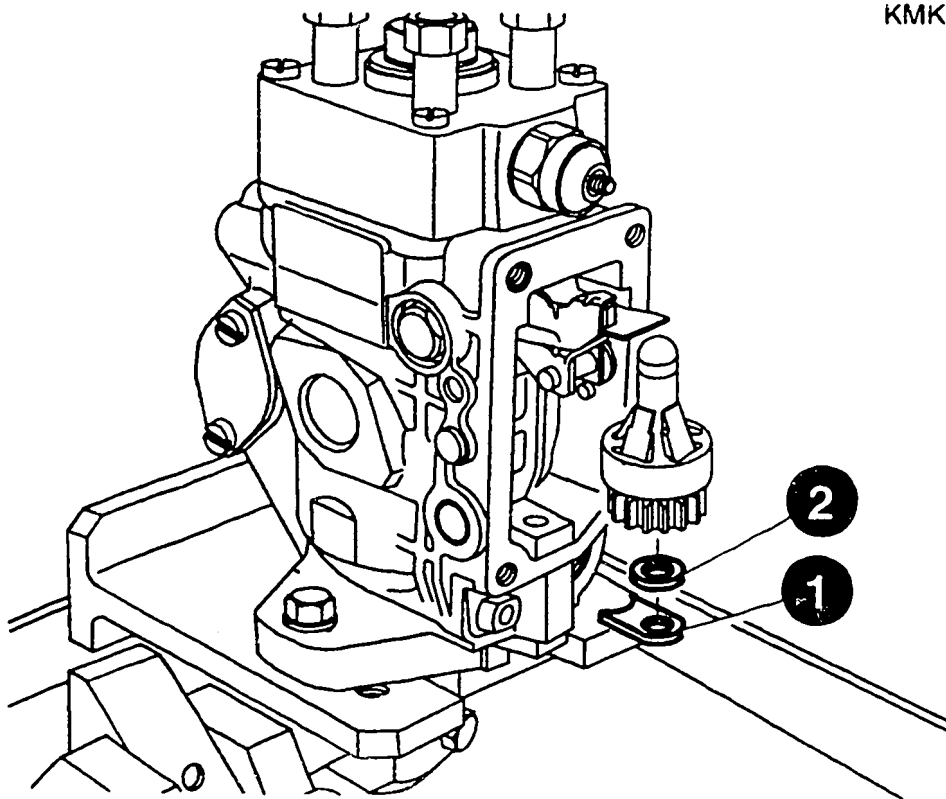
All 4 flyweights must be

replaced together (parts set).

Insert complete flyweight assembly
in housing.

Continue: L06/1 Fig.: L05/2

KMK03441



MEASURING POSITION OF GOVERNOR SHAFT

- * Distributor-type fuel-injection pump with no load-dependent start of delivery (no data in test-specification sheet):

Continue on Coordinate L07/1

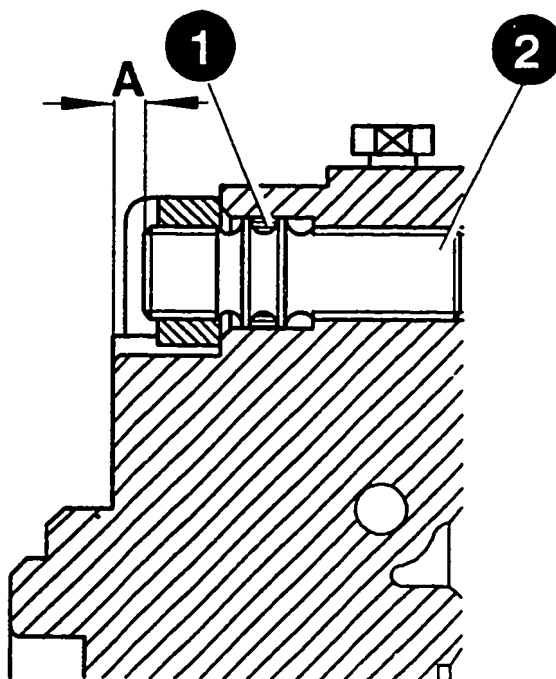
1 = O-ring

2 = Governor shaft

Screw governor shaft with O-ring into housing until dimension $A = 1.5 \dots 2.0$ mm is obtained measured from flange surface to end face of governor shaft.

Continue: L08/1 Fig.: L06/2

KMK03442



MEASURING POSITION OF GOVERNOR SHAFT

- * Distributor-type fuel-injection pump with load-dependent start of delivery (data in test-specification sheet)

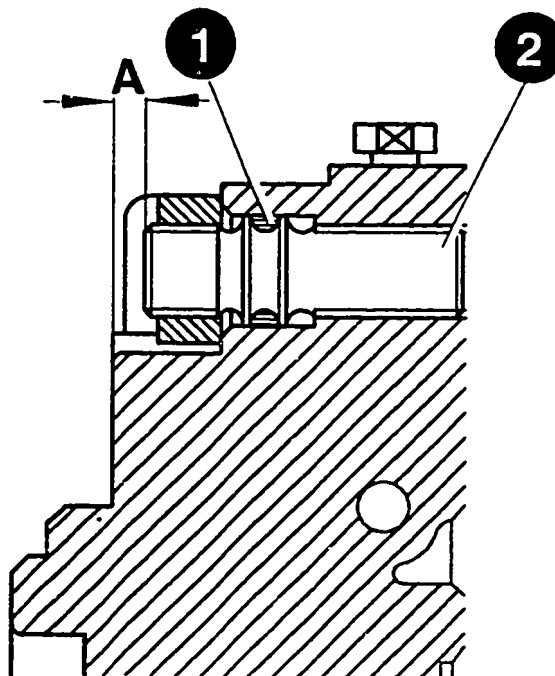
1 = O-ring

2 = Governor shaft

Screw governor shaft with O-ring into housing until A = approx. 3.0 mm measured from flange surface to end face of governor shaft (precise setting is made when testing distributor-type fuel-injection pump).

Continue: L08/1 Fig.: L07/2

KMK03442



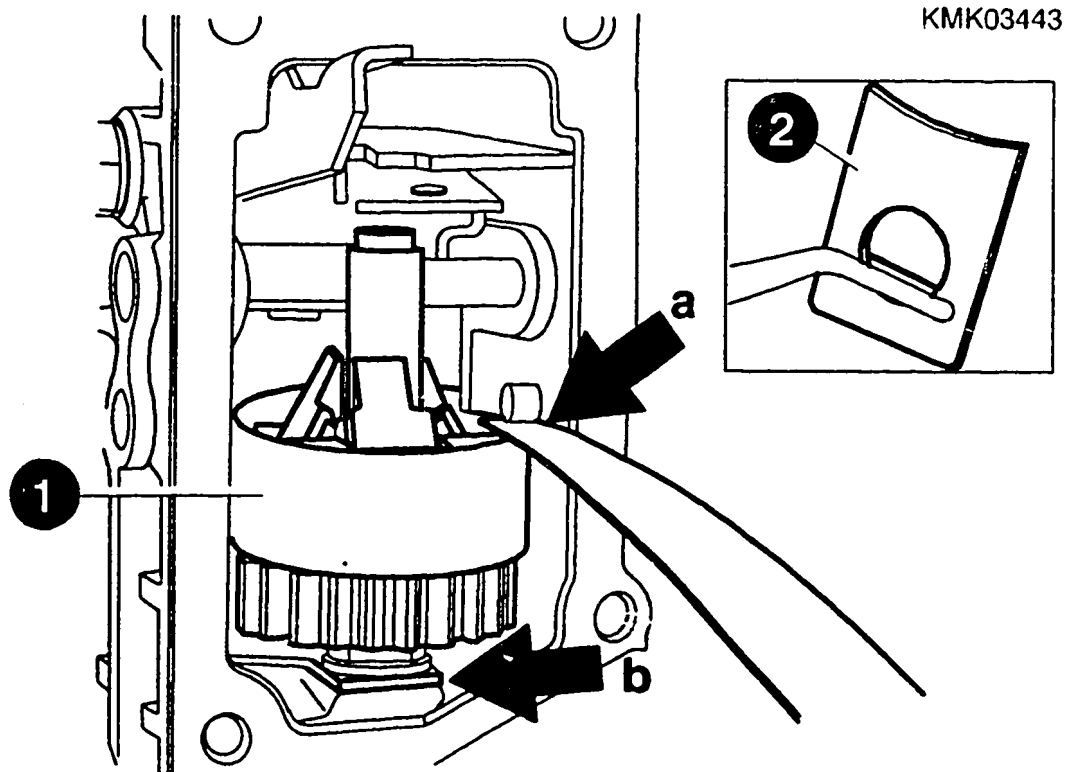
ADJUSTING AXIAL CLEARANCE (WITH AND WITHOUT RECESS AT STOP PIN)

- 1 = Governor assembly
- 2 = Shim plate

Measure axial clearance of governor assembly with feeler gauge (arrow a).
Adjustment dimension 0.25 ... 0.45 mm
Check dimension max. 0.65 mm

Before checking axial clearance, always crank flyweight assembly. This may increase the axial clearance. The check dimension is then max. 0.65 mm.

Continue: L09/1 Fig.: L08/2



ADJUSTING AXIAL CLEARANCE

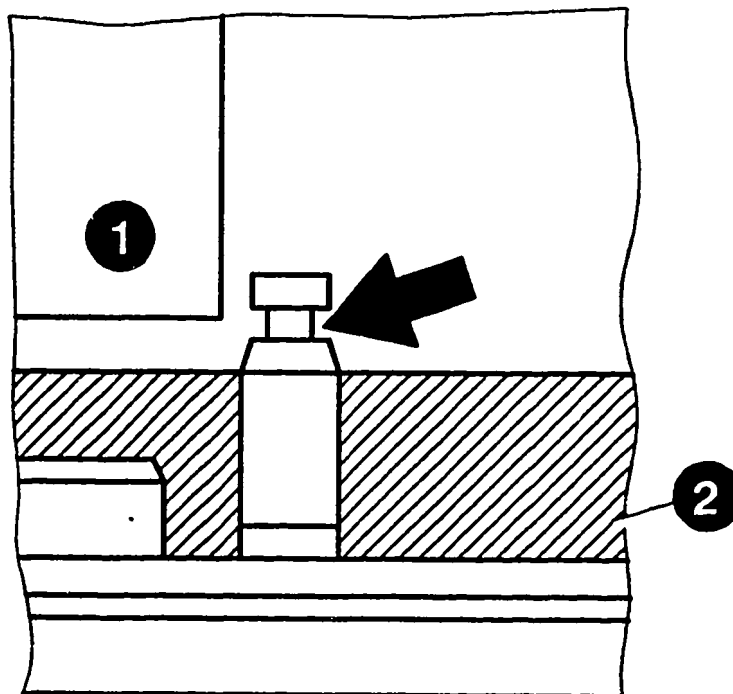
1 = Flyweight assembly

2 = Injection-pump housing

When renewing injection-pump housing or governor assembly, only governor assemblies with bronze bushing may be installed in housing where the stop pin does not have a recess (arrow).

Continue: L10/1 Fig.: L09/2

KMK03444



ADJUSTING AXIAL CLEARANCE

NOTE

When testing field pumps (not repaired fuel-injection pumps) the governor assembly satisfies its function if it does not stick on the stop pin on being cranked. A clearance of min. 0.1 mm is permitted.

If the axial clearance is greater than 0.65 mm, this likewise has no effect on the function of the pump and is not classed as being a fault.

NOTE:

Axial clearance > 1.0 mm cam roller ring tilted in direction of distributor head.

Continue: L11/1

ADJUSTING AXIAL CLEARANCE

Position distributor-type fuel-injection pump such that it is horizontal.

Lock governor shaft with slotted nut/hexagon nut.

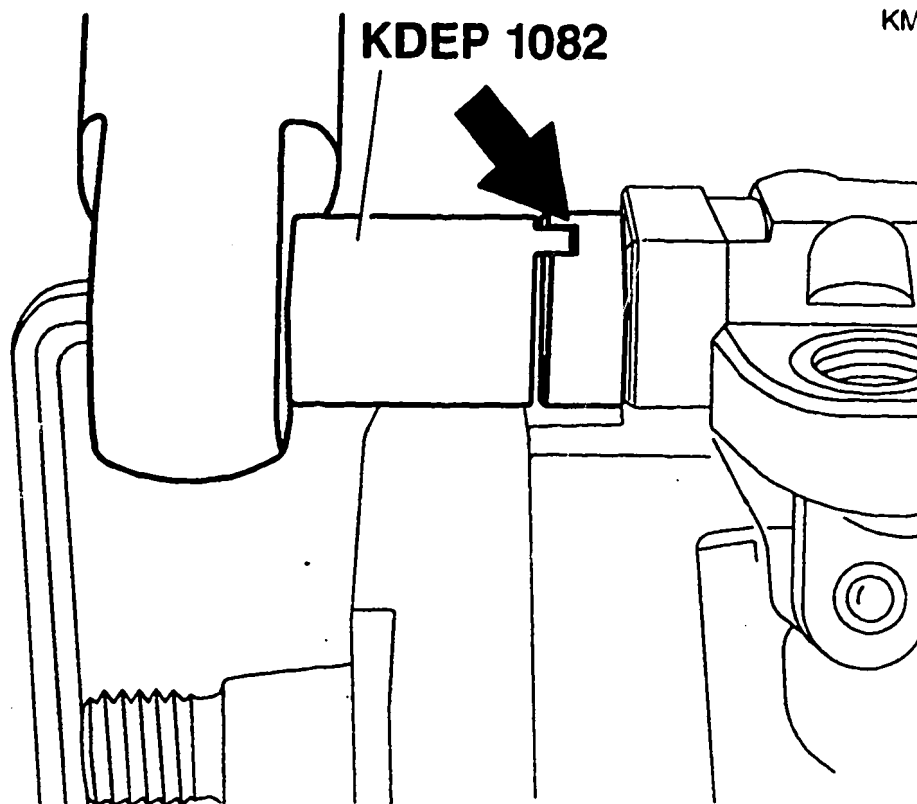
Tightening torque 22 ... 30 Nm

Use adjustment tool KDEP 1082.

NOTE:

As regards all clockwise-rotation fuel-injection pumps with pilot diameter 50 mm, the thread of the governor shaft and pump housing was switched from left-hand thread to right-hand thread as of FD (date of manufacture) 151.

Continue: L12/1 Fig.: L11/2



KMK03445

ADJUSTING AXIAL CLEARANCE

Slotted nuts with left-hand thread may be marked as follows:

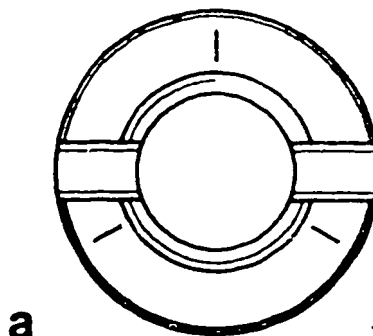
- * Peripheral groove
- * "L" on end faces of slotted nut, picture a
Left-hand thread, yellow surface
- * Notches on end face of slotted nut, picture b

NOTE

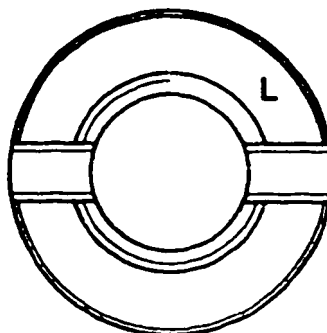
Right-hand thread, white surface

Continue: L13/1 Fig.: L12/2

WMK03446



a



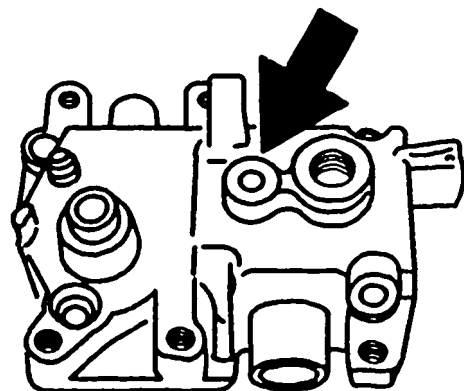
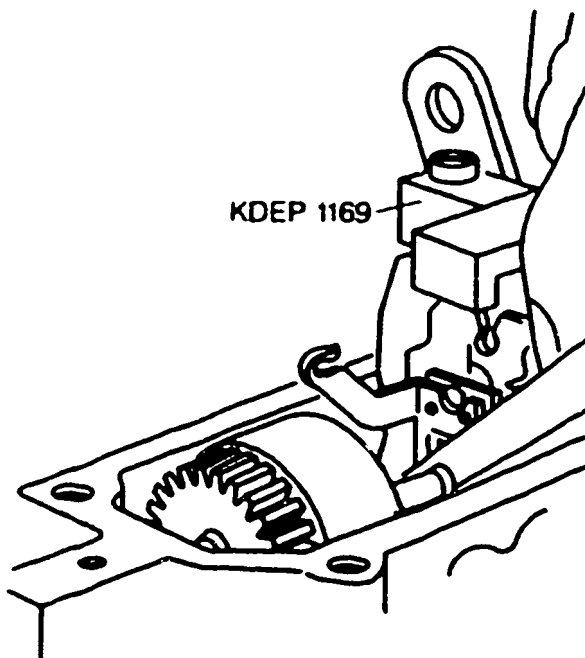
b

**CALIBRATING SLIDING-SLEEVE INITIAL
TRAVEL "MS" DIMENSION**

***Select adjustment in line with
following characteristic features:**

- * Fulcrum lever stop in
distributor-pump housing L14/1**
- * Fulcrum lever stop in housing
(arrow)
Can be seen from outside by
way of recess in housing
cover L16/1**

Continue: L14/1 Fig.: L13/2



KMK02346

**DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)**

*** Stop in pump housing**

1 = Plug

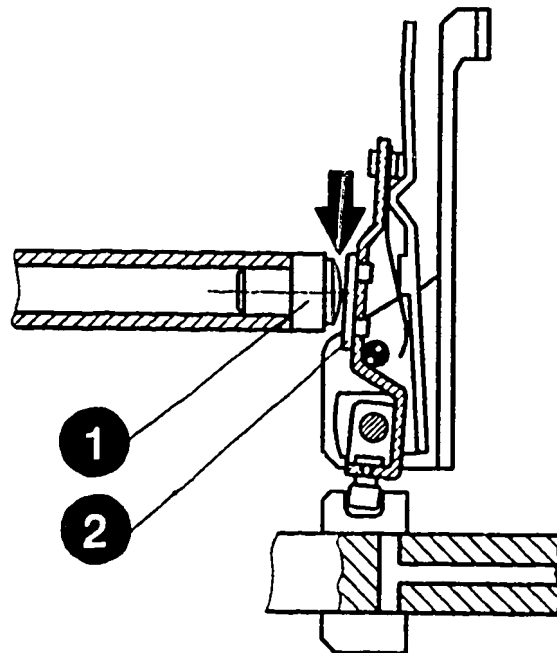
2 = Starting lever

When setting dimension "MS",
particular attention is to be paid to
the correct combination of starting
lever and plug.

The crucial characteristic is the stop
pin (arrow) in the starting lever.

If these combinations are not given
consideration, there will be increased
wear at the contact point of plug and
starting lever.

Continue: L15/1 Fig.: L14/2



KMK02357

DETERMINING DIMENSION "MS" (INITIAL SLIDING-SLEEVE TRAVEL)

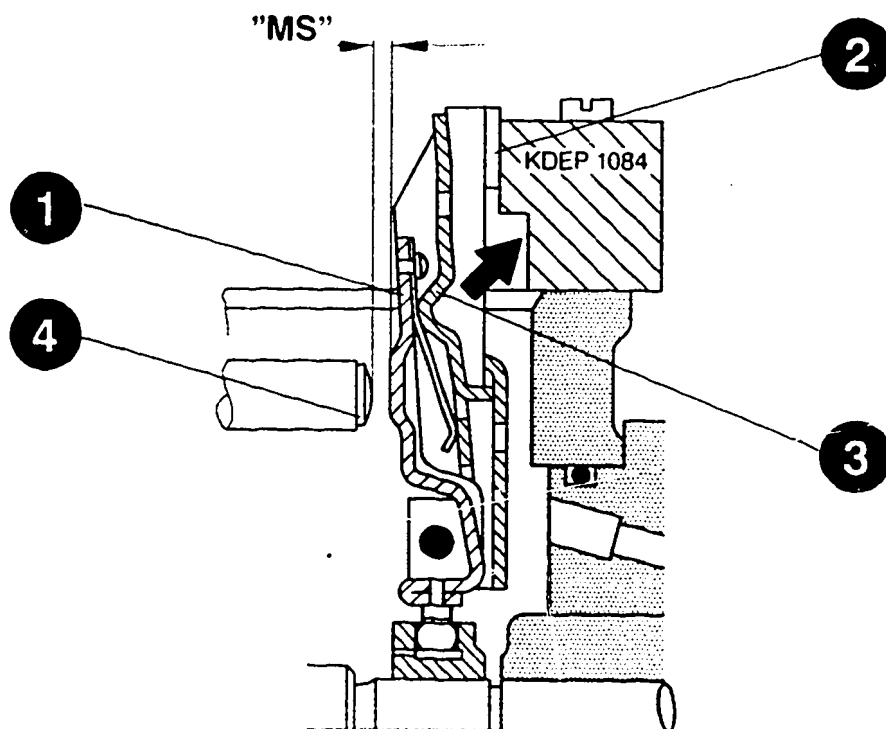
- 1 = Starting lever
- 2 = Correction lever
- 3 = Tensioning lever
- 4 = Plug

The dimension "MS" is the dimension between plug and starting lever in contact with the tensioning lever.

* Stop in pump housing

Attach spacer KDEP 1084 to pump housing. Pay attention to recess (arrow).

Continue: L17/1 Fig.: L15/2

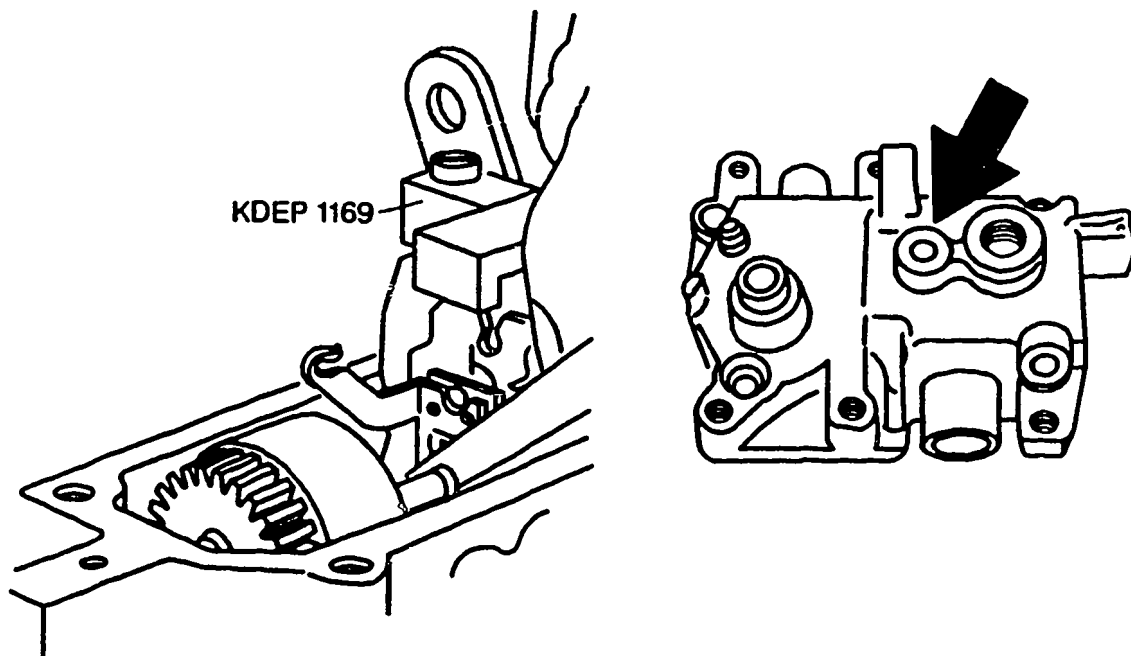


KMK02348

DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)

* Stop in housing cover
Can be seen from recess (arrow) in
housing cover.
Attach stop bracket KDEP 1169 to pump
housing.

Continue: L17/1 Fig.: L16/2



KMK02346

DETERMINING DIMENSION "MS" (INITIAL SLIDING-SLEEVE TRAVEL)

2 = Correction lever

3 = Tensioning lever

* Procedure with KDEP 1084:

Correction lever in contact with spacer.

Press tensioning lever against stop pin.

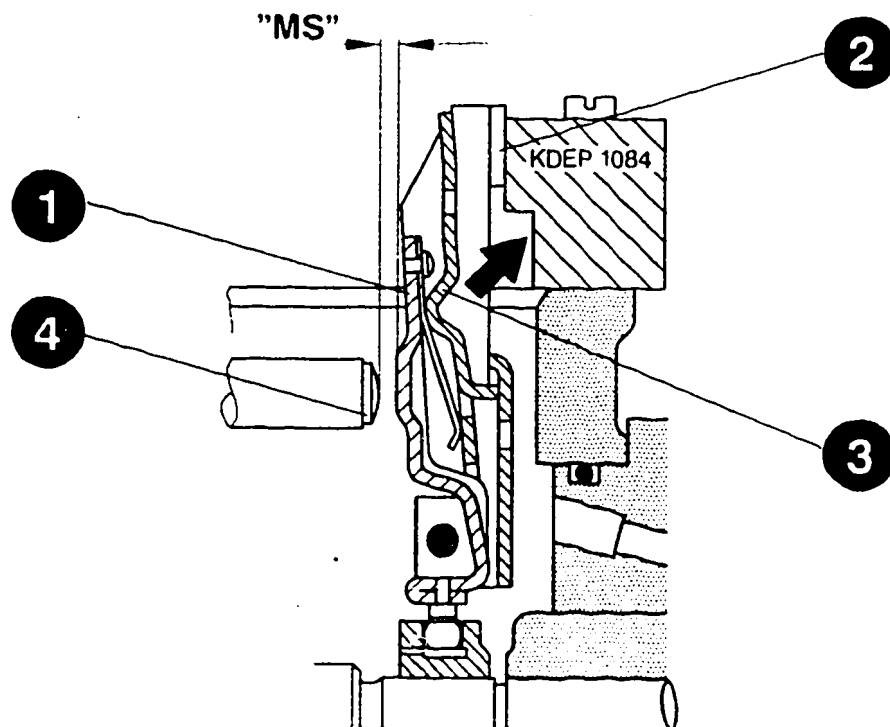
* Procedure with KDEP 1169:

Correction lever in contact with stop bracket.

Press tensioning lever against lug of stop bracket.

Measure dimension "MS" with feeler gauge and compare to desired dimension in test-specification sheet.

Continue: L18/1



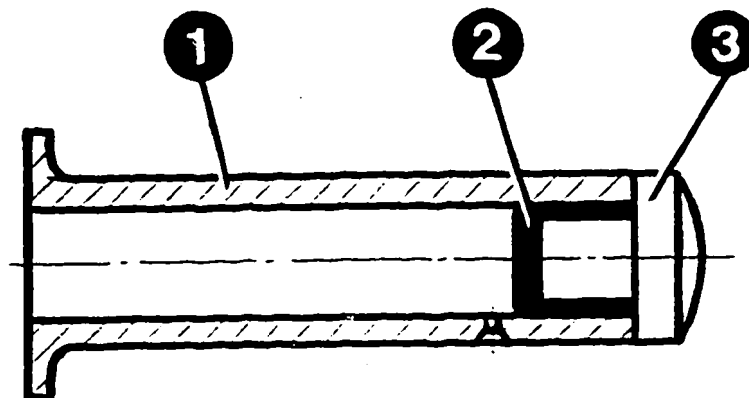
KMK02348

**DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)**

- 1 = Sliding sleeve
- 2 = Rubber sealing cap
- 3 = Plug

Provide compensation for difference in dimension by way of appropriate plug in sliding sleeve.
To do so, the entire governor assembly with sliding sleeve must be removed again.

Continue: L19/1 Fig.: L18/2



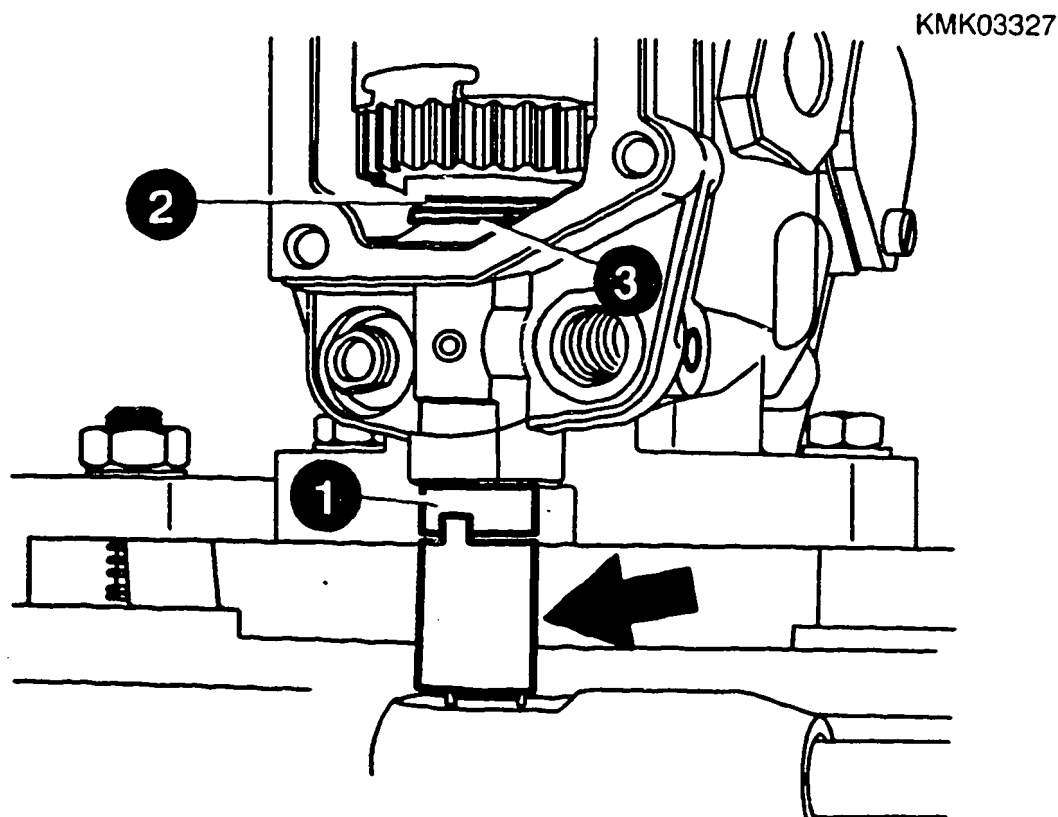
KMK 02351

DETERMINING DIMENSION "MS" (INITIAL SLIDING-SLEEVE TRAVEL)

- 1 = Slotted nut
- 2 = Supporting plate
- 3 = Shim plate

In the case of slotted nuts with identification groove on periphery governor shaft and slotted nut feature left-hand thread.
Position distributor-type fuel-injection pump such that it is perpendicular. Loosen slotted nut with adjustment tool KDEP 1082 (arrow). Pay attention to supporting plate and shim plate.

Continue: L20/1 Fig.: L19/2

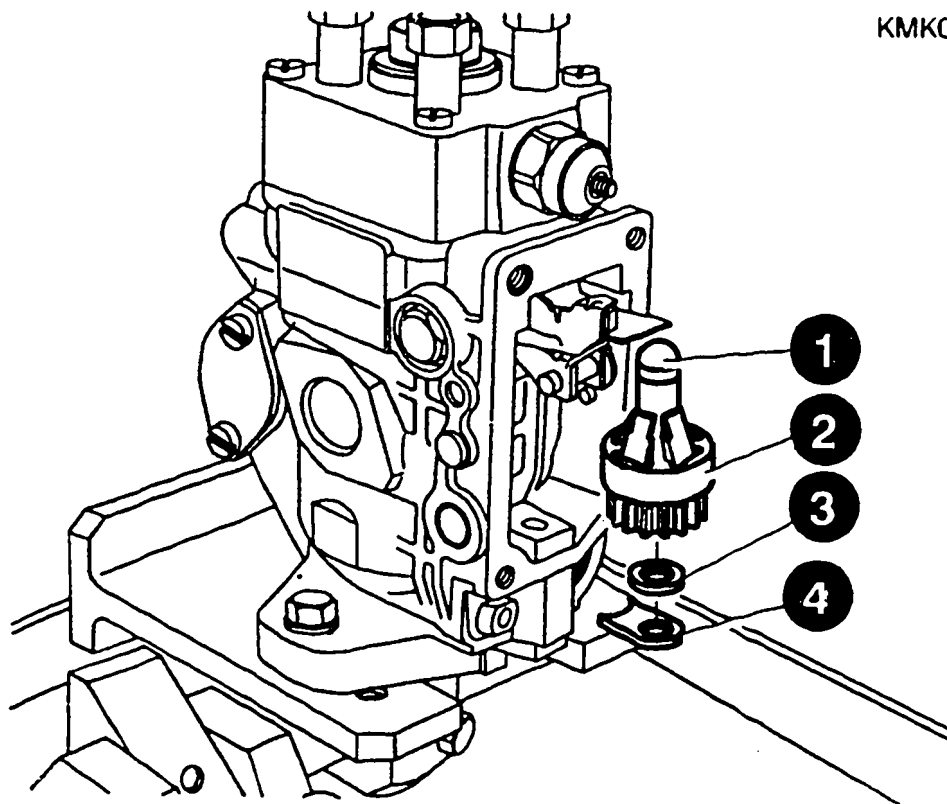


**DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)**

- 1 = Sliding sleeve**
- 2 = Governor assembly**
- 3 = Supporting plate**
- 4 = Shim plate**

**Lift out governor assembly complete
with sliding sleeve.
Remove supporting plate and shim plate.
When disassembling governor assembly,
pay particular attention to spacer
beneath sliding sleeve (take care not
to lose).**

Continue: L21/1 Fig.: L20/2



KMK03447

DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)

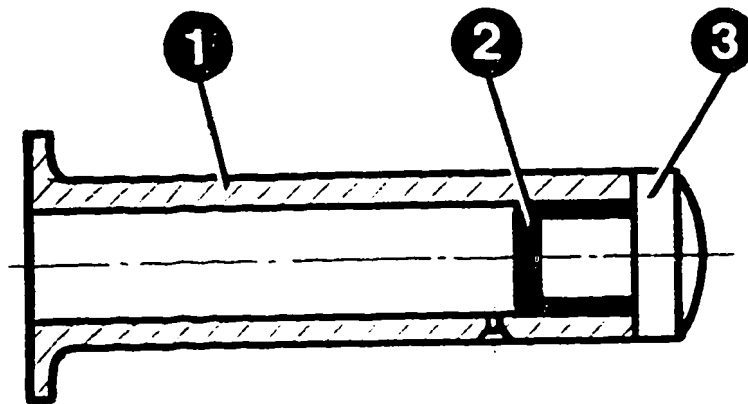
- 1 = Sliding sleeve
- 2 = Rubber sealing cap
- 3 = Plug

As of FD (date of manufacture) 927 the
plug is secured in position in the
sliding sleeve with a rubber sealing
cap instead of with a tab washer.

The sliding sleeve features a
restriction bore with countersink.
(see picture).

Sealing cap may be installed instead
of tab washer. Replacement of sliding
sleeve is not necessary even if
restriction bore has no countersink.

Continue: L22/1 Fig.: L21/2



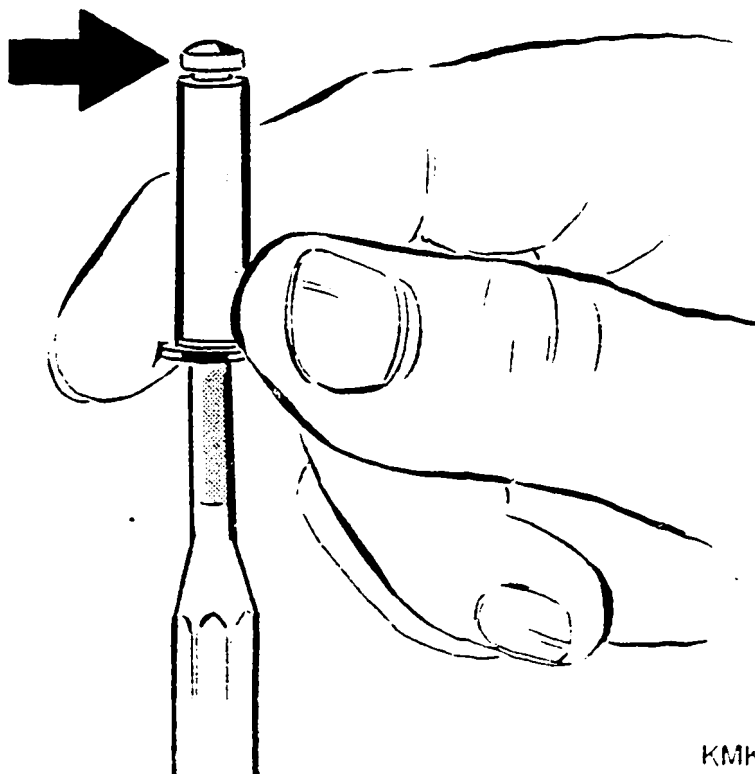
KMK 02351

**DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)**

Press out plug (arrow) with mandrel.
When pressing in appropriate plug, pay
attention to tab washer or rubber
sealing cap.

Re-install governor assembly and
re-check dimension "MS".

Continue: L23/1 Fig.: L22/2



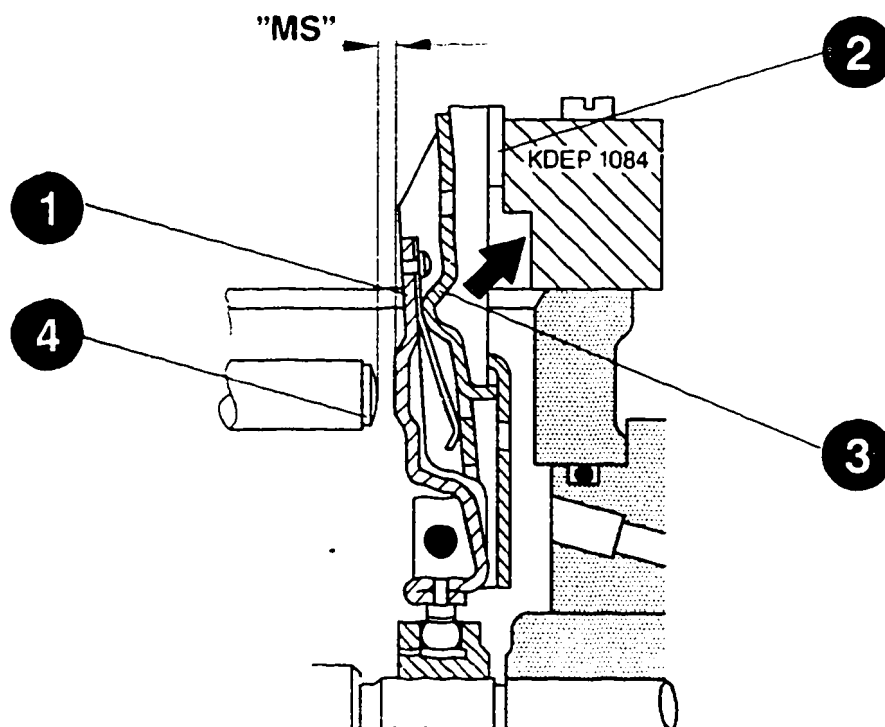
KMK 02352

DETERMINING DIMENSION "MS" (INITIAL SLIDING-SLEEVE TRAVEL)

- 1 = Starting lever
- 2 = Correction lever
- 3 = Tensioning lever
- 4 = Plug

Use grease to bond shim plate and supporting plate into housing.
Assemble governor assembly comprising flyweights, spacer and sliding sleeve with plug.
Attach spacer KDEP 1084 or stop bracket KDEP 1169 to pump housing with fillister-head screws.

Continue: L24/1 Fig.: L23/2



KMK02348

**DETERMINING DIMENSION "MS" (INITIAL
SLIDING-SLEEVE TRAVEL)**

1 = Correction lever

2 = Tensioning lever

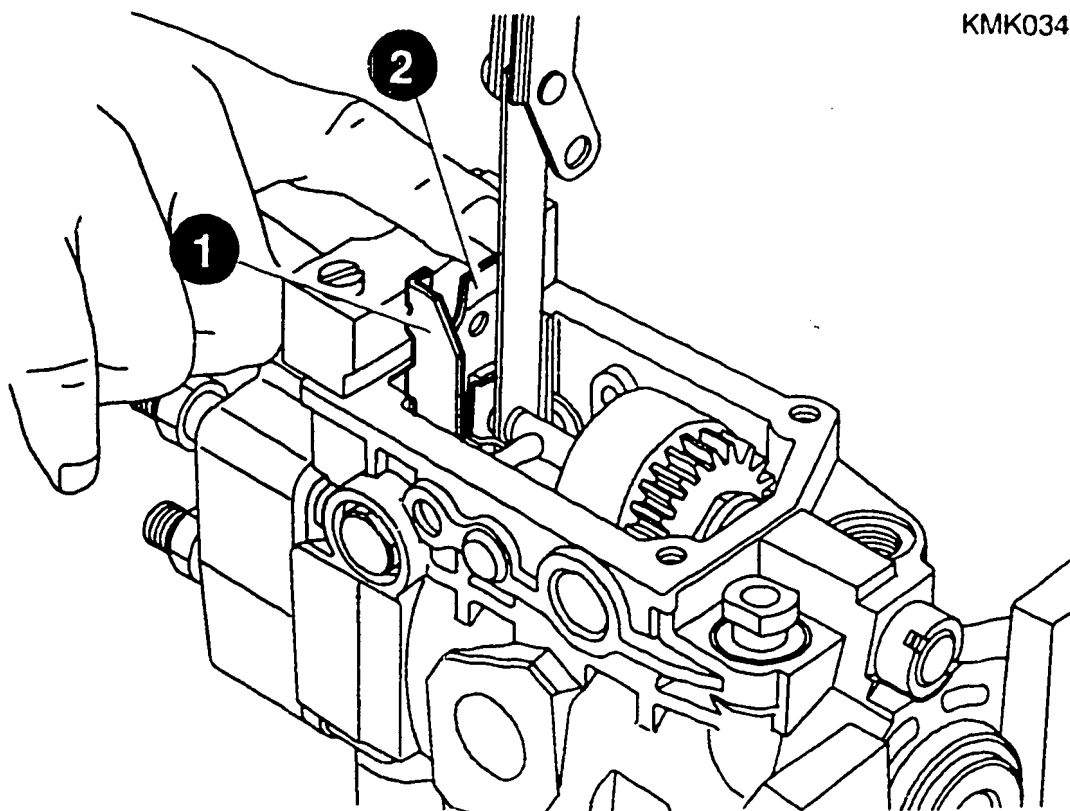
**Correction lever in contact with
spacer.**

**Press tensioning lever
against stop pin.**

**Use feeler gauge to determine
dimension "MS" and compare data in
test-specification sheet.**

**Remove spacer KDEP 1084 if dimension
"MS" is correct.**

Continue: L25/1



KMK03448

INSTALLING GOVERNOR

Select adjustment sequence in line
with following characteristics:

- * Part-load governor with
detachment surfaces L26/1
- * Part-load governor with no
detachment surfaces 127/1
- * Variable-speed governor M02/1

Continue: L26/1

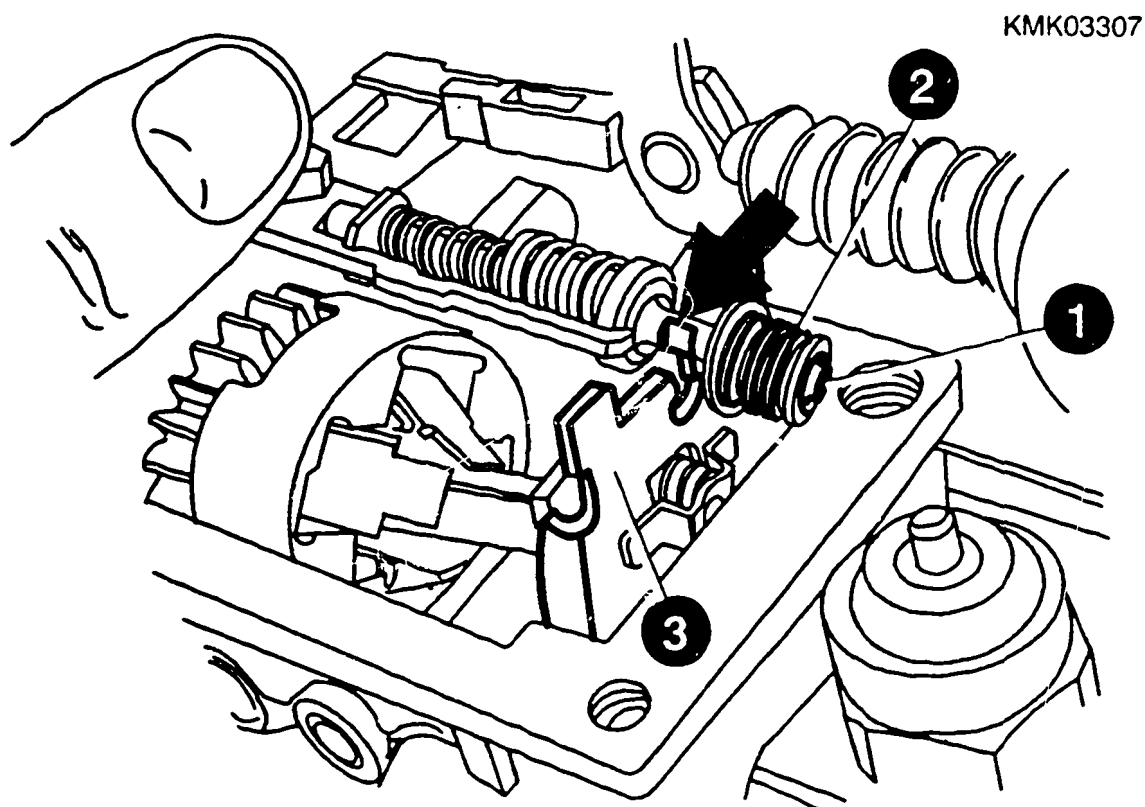
INSTALLING PART-LOAD GOVERNOR

* Version with detachment surfaces

- 1 = Retaining pin
- 2 = Intermediate spring
- 3 = Tensioning lever

Engage milled surfaces (arrow) of part-load governor in part-load governor such that retaining pin and intermediate spring are behind tensioning lever.

Continue: L28/1 Fig.: L26/2



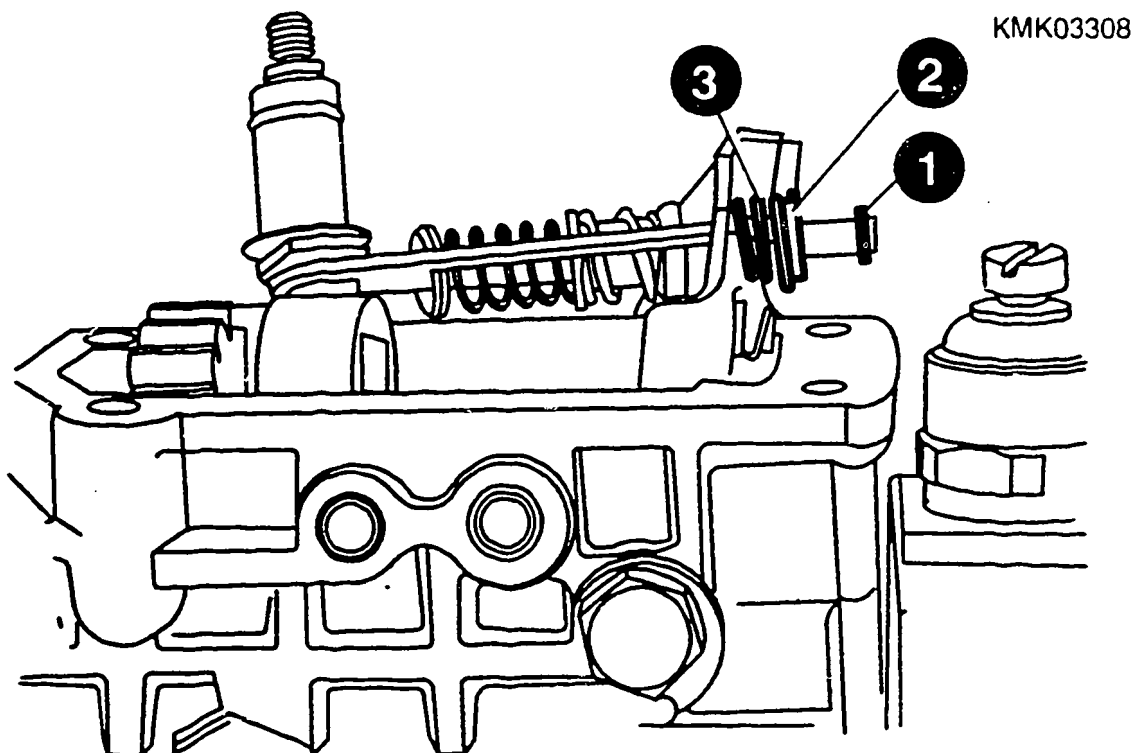
INSTALLING PART-LOAD GOVERNOR

* Version with no detachment surfaces

- 1 = Retaining ring
- 2 = Retaining pin
- 3 = Intermediate spring

Insert part-load governor with setting shaft in fulcrum lever assembly.
Push intermediate spring and retaining pin onto guide pin (part-load governor).
Install retaining ring on guide pin.

Continue: L28/1 Fig.: L27/2



INSTALLING PART-LOAD GOVERNOR IN HOUSING

- 1 = O-ring
- 2 = Setting shaft
- 3 = Shim

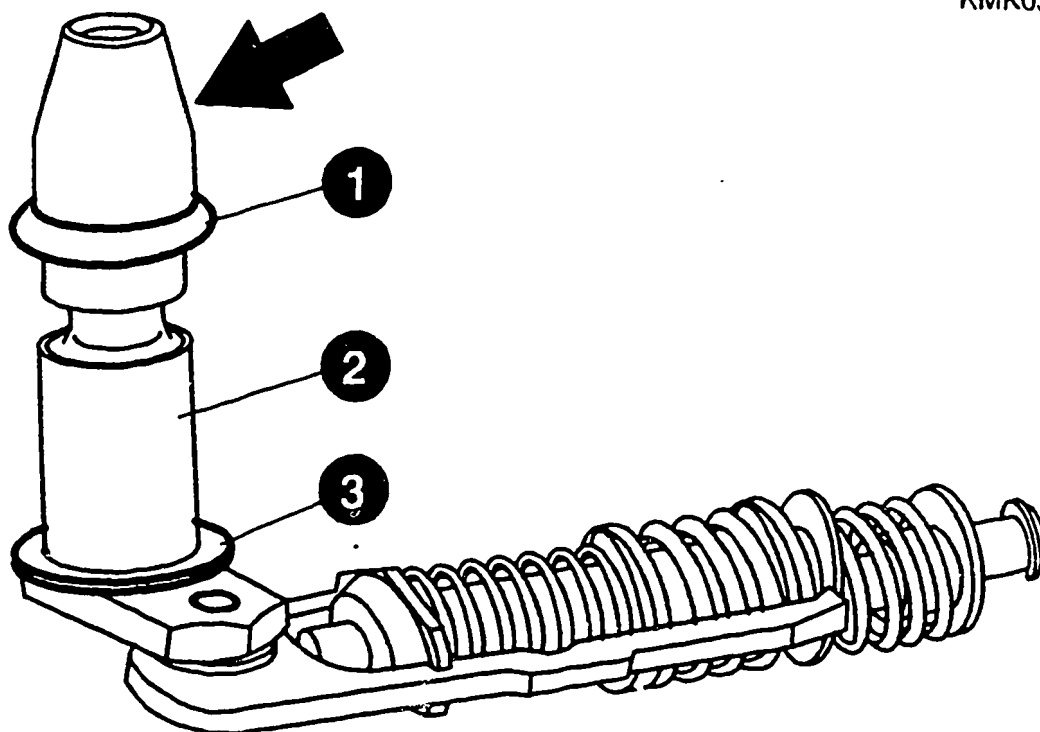
Fit shim.

Install assembly sleeve KDEP 2937 on setting shaft to protect O-ring.

Fit O-ring.

Continue: M01/1 Fig.: L28/2

KMK03309

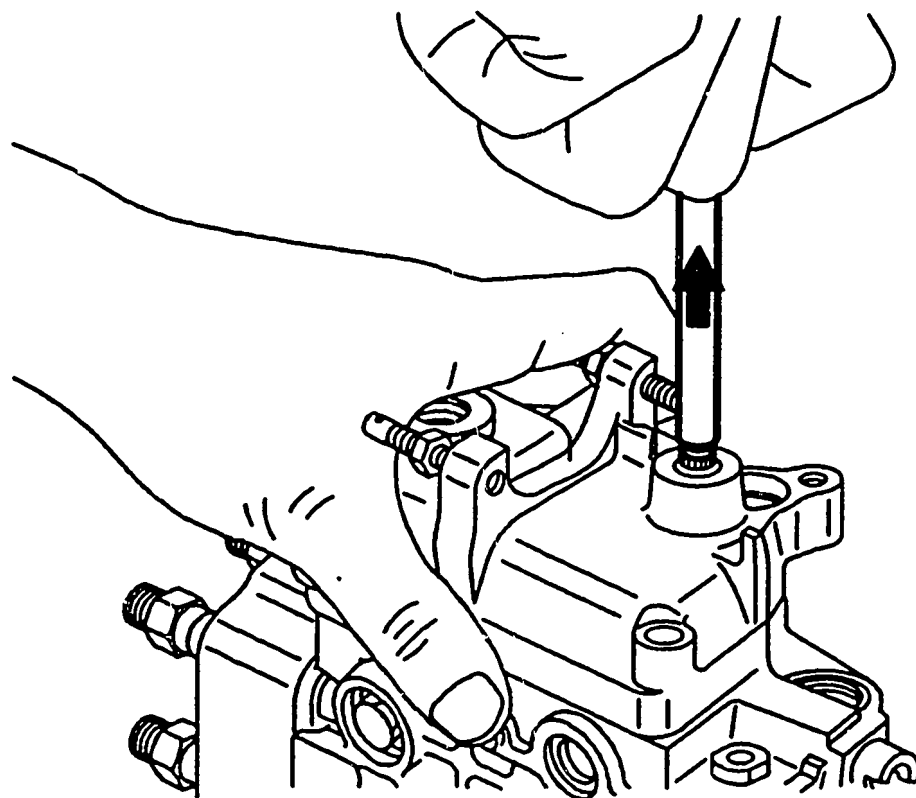


INSTALLING PART-LOAD GOVERNOR IN HOUSING

Insert new seal ring in housing cover.
Position housing cover on pump housing.
Pull part-load governor through housing cover with assembly wrench KDEP 1096 (arrow).
Fit new threaded pin (full-load stop screw).

Attach housing cover.

Continue: M05/1 Fig.: M01/2



KMK03306

INSTALLING VARIABLE-SPEED GOVERNOR

- 1 = Retaining pin with compression spring
- 2 = Tensioning lever
- 3 = Governor spring

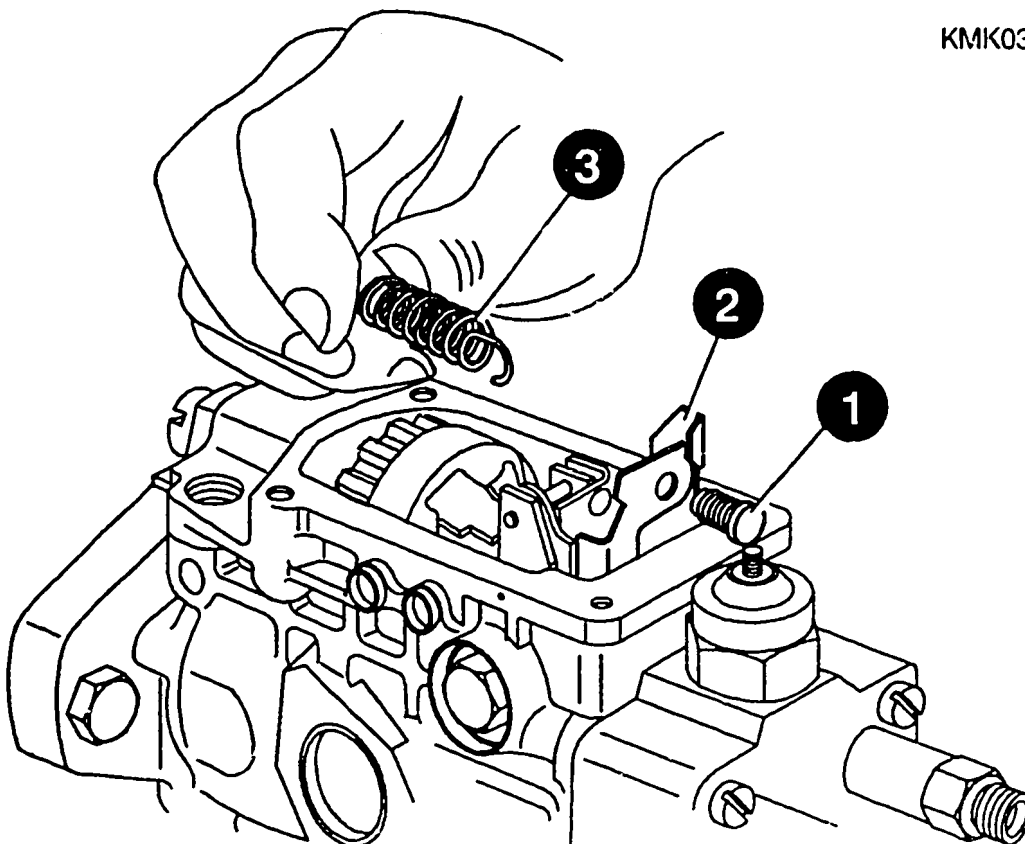
Insert retaining pin with compression springs through hole in tensioning lever and engage extension spring.

Note:

Retaining pin with compression springs is to be viewed as a unit and may only be replaced complete (parts set).

Continue: M03/1 Fig.: M02/2

KMK03304



INSTALLING VARIABLE-SPEED GOVERNOR

- 1 = Shim
- 2 = O-ring

Position shim and O-ring on control lever shaft.

Attach assembly sleeve KDEP 2937 to setting shaft to protect O-ring.

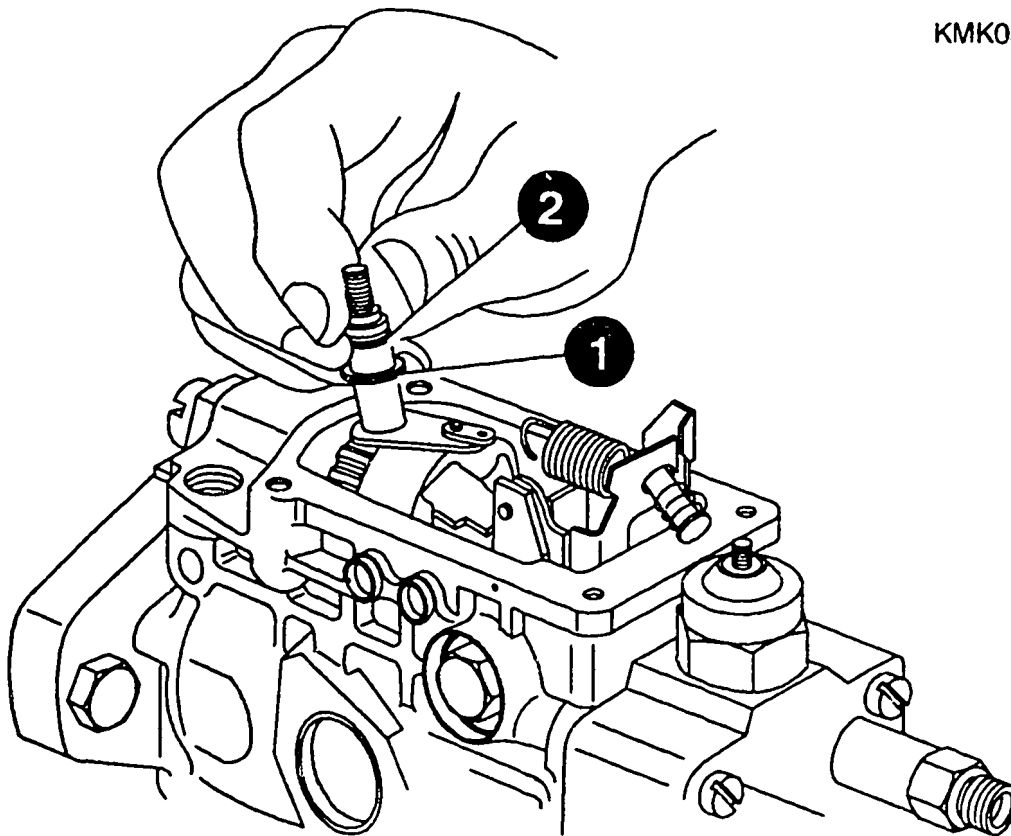
Engage governor spring at joint of setting shaft.

Make sure that eye opening faces downwards.

Grease O-ring of setting shaft before installing setting shaft in governor cover.

Continue: M04/1 Fig.: M03/2

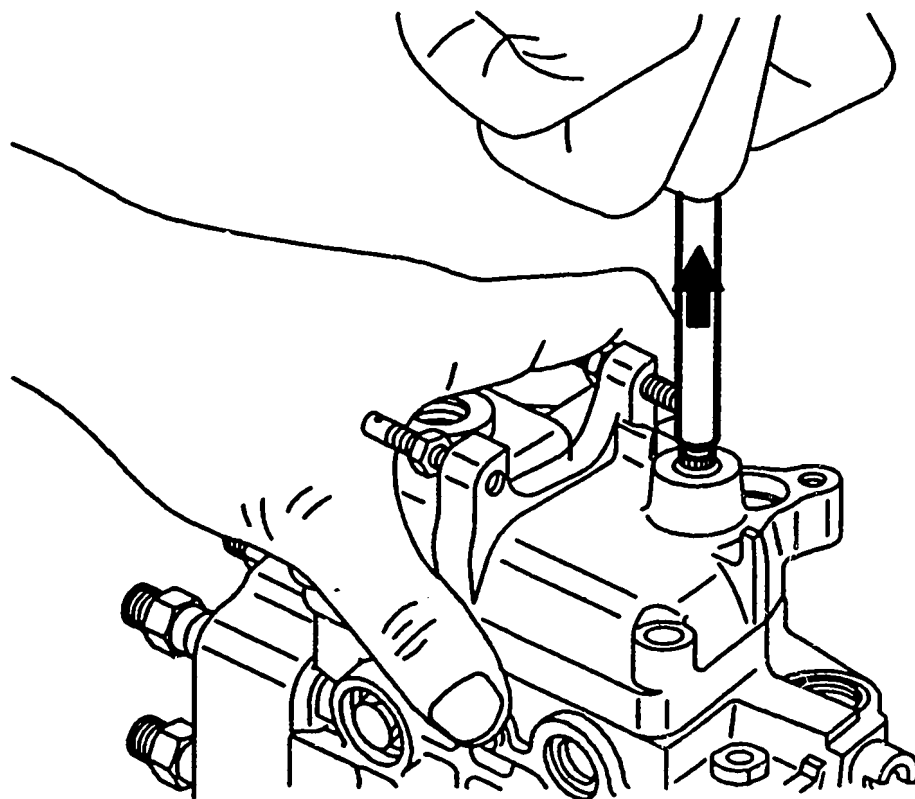
KMK03305



INSTALLING VARIABLE-SPEED GOVERNOR

Fit new seal ring in housing cover.
Attach housing cover to pump housing.
Pull governor through housing cover
with assembly wrench KDEP 1096 (arrow).
Attach housing cover.
Fit new threaded pin (full-load stop
screw).

Continue: M05/1 Fig.: M04/2



KMK03306

FITTING CONTROL LEVER

Select adjustment sequence in line
with following characteristics:

Fitting control lever with single spring system	M06/1
--	-------

Fitting control lever with double spring system	M07/1
--	-------

Continue: M06/1

FITTING CONTROL LEVER

* Single spring system

1 = Cylindrical helical coiled spring

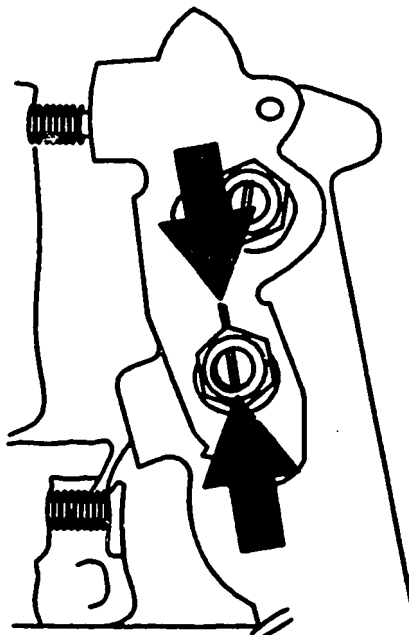
2 = Control lever

3 = Hexagon nut with spring lock washer

Fit cylindrical helical coiled spring and control lever. Install control lever on setting shaft such that marks on control lever and setting shaft coincide (arrows).

Screw in overflow restriction "OUT".

Continue: M11/1 Fig.: M06/2



KMK02289

FITTING CONTROL LEVER

* Double spring system version

1 = Cylindrical helical coiled spring

2 = Spring seat

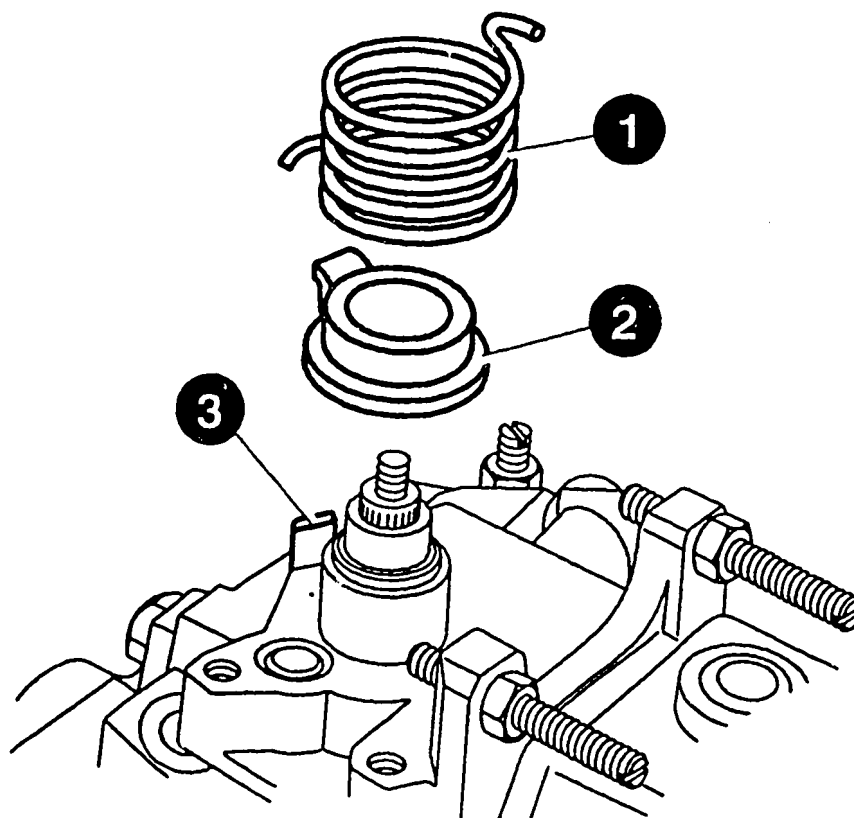
3 = Engagement point

Position lower spring seat of first
spring on housing cover.

Engage end of spring with spring seat
at engagement point.

Continue: M08/1 Fig.: M07/2

KMK03449



FITTING CONTROL LEVER

* Double spring system version

1 = Spring seat with engagement points

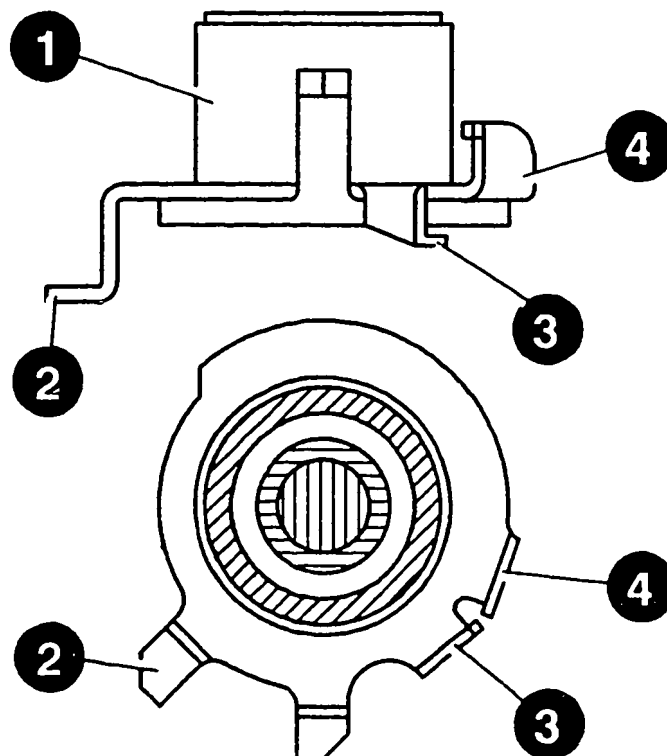
Fit spring seat with engagement points and position end of spring against tab (2).

NOTE:

When relieving tension on spring, end of spring makes contact with tab (2). This prevents uncontrolled jumping away of the spring.

Continue: M09/1 Fig.: M08/2

KMK03450



FITTING CONTROL LEVER

* Double spring system version

1 = Spring seat with engagement points

2 = Tab

3 = Engagement point, lower spring

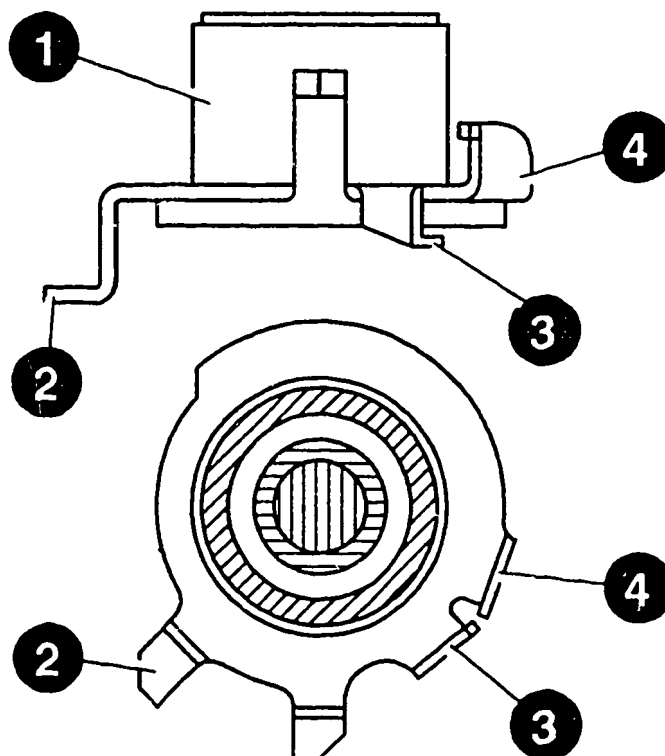
4 = Engagement point, upper spring

Position upper spring at engagement point (2).

Engage lower spring at engagement point (3).

Continue: M10/1 Fig.: M09/2

KMK03450



FITTING CONTROL LEVER

* Double spring system version

Fit control lever making sure that end of spring makes contact with fastening screw (arrow) of small control lever.

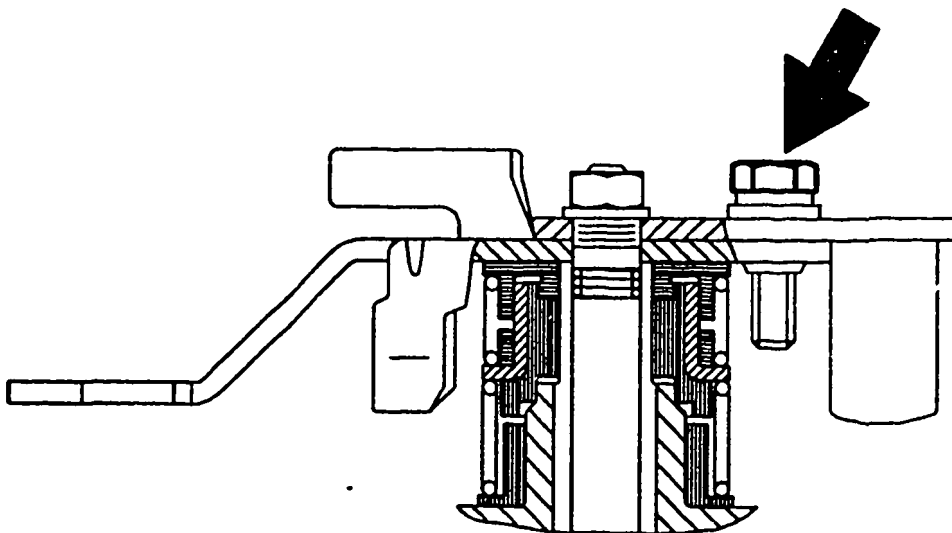
Engage end of spring in engagement point at speed-control lever.

Note:

Tab must not make contact with LDA housing (if provided).

Continue: M11/1 Fig.: M10/2

KMK03451



**INSTALLING TEMPERATURE-CONTROLLED
IDLE INCREASE (TLA)**

Assembling control device:

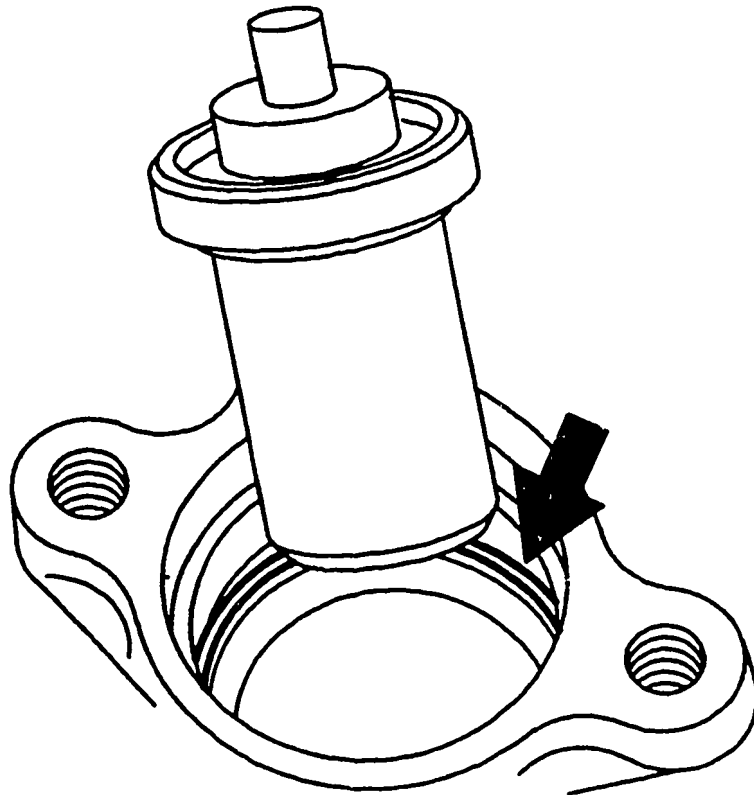
**Insert O-ring (arrow) in bottom part
of control device.**

**Pin must not be pulled out of
thermostat !**

**Insert thermostat into control device.
Screw in threaded ring and tighten
with pin-type socket wrench KDEP 1110.**

Continue: M12/1 Fig.: M11/2

KMK03452



CHECKING BOTTOM PART OF CONTROL DEVICE FOR LEAKAGE

Connect one of the cooling-water fittings to compressed-air system.

Seal off second fitting with KDEP 1111.

Apply 5.0 bar to bottom part of control device and check for leakage in oil bath.

Continue: M13/1

INSTALLING CONTROL DEVICE

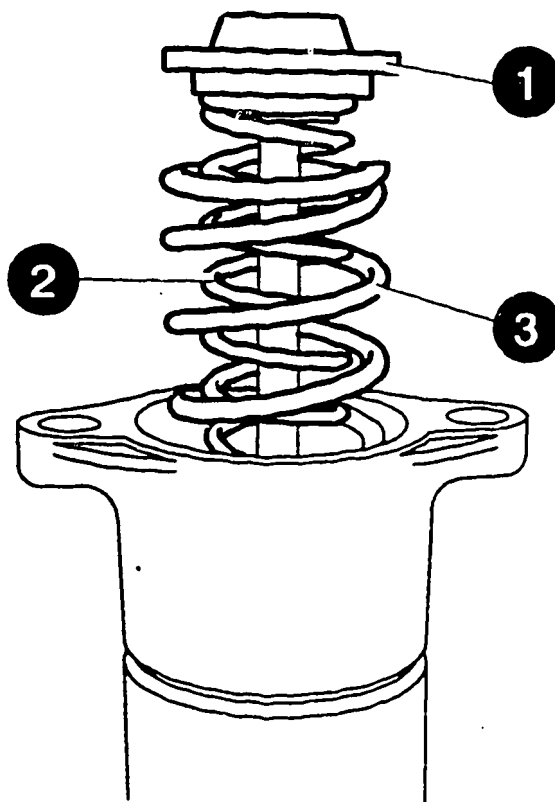
- 1 = Spring seat
- 2 = Inner compression spring
- 3 = Outer compression spring

Insert top part of control device in assembly device KDEP 1109.

Insert both compression springs in control device.

Position spring seat with cable on compression springs.
In doing so, insert cable into guide hole in top part of control device.

Continue: M14/1 Fig.: M13/2



KMK03453

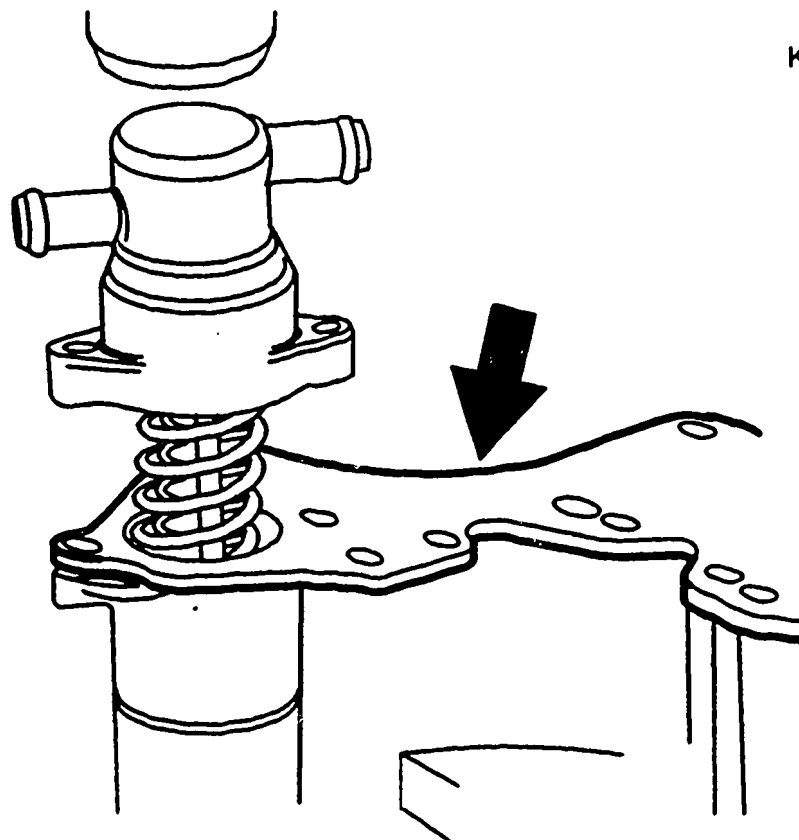
INSTALLING CONTROL DEVICE

Pay attention to installation position with following operations.

Place support plate on top part of control device (arrow).

Position bottom part of control device (complete) on top part.

Continue: M16/1 Fig.: M14/2



KMK03454

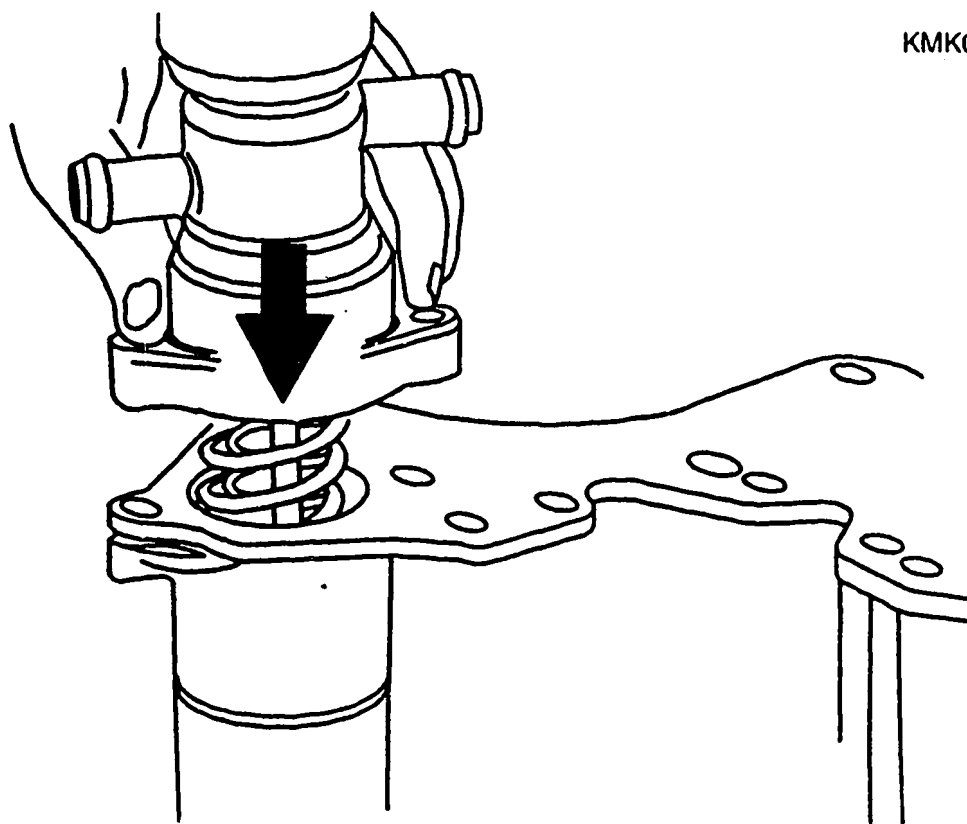
INSTALLING CONTROL DEVICE

When performing following operation, make sure that guide sleeve of wire rope/bottom part of control device is not damaged.

Carefully press bottom part of control device onto top part using mandrel press.

Screw in and tighten fillister-head screws.

Continue: M16/1 Fig.: M15/2



KMK03455

INSTALLING CONTROL DEVICE

Remove complete control device from assembly device.

For checking purposes do not yet attach control device to distributor head.

Continue: N23/1

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distributor-pump plunger.....J02/1
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ASSEMBLING DISTRIBUTOR-TYPE FUEL-INJECTION PUMP

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